



Enhancing the Effectiveness of Conservation Potential of Marine Mammals in Indian Seas

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Final Project Report



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Cover Image: Mass mortality of Short-finned Pilot Whale *Globicephala macrorhyncus* stranded on 11-15th January, 2016 at Manapad coast, Gulf of Mannar, Tamil Nadu (Photo credit: R. Jeyabaskaran).

Detailed Project Report

Subject area, to which the proposed study
Contributes

Keystone Marine Species

Title of the study

**Enhancing the effectiveness of conservation
potential of marine mammals in Indian seas**

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Executive summary

The project was initiated during 2015 and different technical activities were carried out to meet the objectives. Analysis of the records on stranding of marine mammals during the 216 year period from 1800 to 2016 indicated that 25 species consisting of 5 baleen whales, 4 toothed whales, 14 dolphins and one each of finless porpoise and sea cow were reported as stranded along the Indian coast.

The number of stranding records was only 21nos, (0.2 per year or one stranding in every 5 year) during the period 1800 to 1889 while it increased to 243 (2.4 nos per year) in the succeeding century and during the 16 years since 2000, 115 (7.2 per year) stranding have been reported. This alarmingly high rate is a matter of concern and has to be prevented or reduced at the earliest.

Among the five groups highest stranding was among dolphins (39%) followed by baleen whales (23%), sea cow (22%), toothed whales (11%) and finless porpoise (5%).

The stranding of baleen whales was recorded in all the maritime states along west coast except Goa, while along east coast (except Tamil Nadu), the stranding records were low. Stranding of toothed whales was highest, along Tamil Nadu (51%) coast followed by Lakshadweep Islands (16%).

Tamil Nadu recorded highest (53%) stranding of porpoises followed by Kerala and Karnataka (16% each). No stranding of Porpoises was observed along Goa, West Bengal, Andhra Pradesh and in the Island territories.

Dugong stranding was observed only from states which have sea grass habitats; Tamil Nadu (79%), Gujarat (14%) and A&N islands (7%). The most common species which was stranded was the dugong (66 nos; 22%) along Tamil Nadu, Gujarat and A&N Islands. Since this species has restricted distribution, it is important to identify the reasons for stranding and reduce such incidences.

Stranding of Fin whale, Killer whale, False Killer whale, long-beaked common dolphin, Irrawaddy dolphin, Melon-headed whale were not observed during this century.

It was observed that gill nets are responsible for 98.8% of the mortalities and occasional reports of incidental catch / entanglement in trawl, purse seine, shore seine and long line has also been recorded since 1970s.

From 1976 to 2013, about 766 entanglements / incidental catch of dolphins in fishing gears has been reported from Karnataka, Kerala, Tamil Nadu and Andhra Pradesh. Highest fishing related mortality were reported from Kerala (526 nos.) followed by Tamil Nadu (231 nos.).

A total of 45 porpoises have been found to be caught by fishing nets along Karnataka (34nos), Kerala (9nos; from gill nets) and one each from Gujarat (dol net) and Tamil Nadu (gill net)

According to the survey conducted among fishermen dolphin population has increased and this has negatively affected their fishing activities. Damage to gear and financial loss to mend this is a problem cited by gill netters of South India.

A database on marine mammals was developed and programming for an interactive web site was initiated. However, this could not be completed.

Since officials of Forest department are responsible for reporting and handling marine mammals which are listed as endangered, officials from different maritime states were identified to form a network. Communication was also sent to all the officials regarding this. In addition to this, staff from CMFRI, NGOs, village groups, ZSI, CARI and Department of Fisheries were also included in the list. The network of 99 members is yet to be activated. The proposed national workshop could not be conducted.

Awareness material on the methods for rescue operations were conducted at Tamil Nadu, Maharashtra and Kerala

Recommendations for conservation and protection of cetaceans have been listed.

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Abbreviations

AP	Andhra Pradesh
A& N Islands	Andaman and Nicobar
CARI	Central Agricultural Research Institute
CMFRI	Central Marine Fisheries Research Institute
CMPA	Coastal Marine Protected Areas
EEZ	Exclusive Economic Zone
GOA	Goa
GUJ	Gujarat
GN	Gill Net
GoM	Gulf of Mannar
KAR	Karnataka
KER	Kerala
LAK Islands	Lakshadweep
MAH	Maharashtra
MMC	Marine Mammal Conservation
MoEFCC	Ministry of Environment, Forests and Climate Change
NGO	Non- Governmental Organization
NPoA	National Plan of Action
NOAA	National Oceanic and Atmospheric Administration
OR	Orissa
PB	Palk Bay
PS	Purse seine
TN	Tamil Nadu
WB	West Bengal

1. Introduction

Marine mammals of the Indian Seas have always enthralled human populace and their stranding and sightings have been always been reported with awe. During the past two centuries, reports have been made on these wonderful apex predators of the marine ecosystem. Their role in the ecosystem has also been studied to a limited extent. However, their population has been subject to different types of threats ranging from incidental trapping in fishing gear to loss of balance leading to mortality due to underwater noise pollution. It has also been indicated that they are affected by climate change.

Marine mammals play an important role in shaping the behavior and life history traits of prey species and predators, in nutrient storage and recycling, and in modifying benthic habitats. In India, the ocean and coastal ecosystems provide livelihood opportunities for over 20 million people along a coastline of 7,500 km. Increased industrialization and a rapidly growing population in coastal areas exert an immense pressure on these ecosystems, to the extent that their conditions have become critical in many parts of India, and their continued conservation has become a very challenging task for all institutions concerned. The impacts have been visible on the biomass of several commercially important finfishes and shellfishes. Apart from this, the whales, dolphins, porpoises and sea cow have also been equally affected.

The negative impact of global climate change is also known to exercise additional pressure on coastal and marine habitats. Strengthening a more participative approach in the establishment and management of protected areas is considered one of the most promising strategies to counter widespread losses in biodiversity due to unsustainable practices of those engaged – often illegally – in the exploitation of the areas under protection.

In the above context and also in support of India's global context in striving towards achieving the Aichi targets, the Ministry of Environment, Forests and Climate Change (MoEFCC), Government of India entered into a Technical Cooperation with the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB), on the project titled "Conservation and Sustainable Management of Existing and Potential Coastal and Marine Protected Areas" (CMPA). Under this project, conservation of marine mammals of India was considered as an important theme.

All the 27 species of marine mammals in the Indian seas are protected under Wildlife (Protection) Act 1972. While the Act has significantly reduced intentional capture of marine mammals, incidental capture in fishing gears is still a cause for concern. Considering these issues, the need for National Plan of Action for Marine Mammal Conservation (NPoA – MMC) was keenly felt. For preparation of NPoA – MMC, it was important to have strong scientific inputs on the key threats facing the marine mammals in the Indian seas. It is in this context that a project entitles “Study on enhancing the effectiveness of conservation potential of marine mammals in Indian seas “was sanctioned to CMFRI.

Though fisheries form one of the major, activities in the Indian EEZ, the impacts of the fishing activities on marine mammal have been a major cause for concern. Mechanized fishing was introduced on a commercial scale in India in the mid-1960s. Since then, the fisheries sector has grown rapidly. Marine fisheries census carried out by CMFRI in 2010 shows that there are 58,911 mechanized fishing craft along the Indian coast operating trawlnet, gillnet, long lines, dolnet and purseseines. The efficiency of fishing vessels has increased, resulting in longer sea endurance, extension of fishing to oceanic waters and introduction of larger and efficient gear. The growing number and efficiency of mechanized boats have increased the chances of fishing gear – marine mammal encounters. Unfortunately the incidental kills of marine mammals have not been regularly monitored in India

For developing conservation measure, it is imperative to have knowledge on the distribution and abundance of the targeted resource. Sine marine mammal stock cannot be made using methods for other marine resources; stranding records are used as an indirect means to monitor the status, distribution, seasonal and abundance of marine mammals. It has been documented that 380 stranding records are available in the Indian seas during the last 60 years (Vivekanandan and Jeyabaskaran, 2012). About 85% of the strandings have been reported by researchers from Central Marine Fisheries Research Institute (CMFRI). Recurring stranding events are also reported frequently along the entire Indian coast. However, these records have been documented by independent researchers/naturalist/conservationist in scattered grey literature with limited scope for access. Establishing a network for data retrieval, analysis and interpretation is essential to understand the characteristics of the stranding events, which are important for advocating conservation measures. Establishment of a network and database for marine mammals of India is one of the major recommendations of the International Colloquium on Marine Mammals (CIMCAR-2011) organized by the Marine Biological Association of India and also of the Marine Mammal Stranding Workshop organized by CMFRI in collaboration with NOAA, USA in 2010.

It is well known that any conservation program in the marine ecosystem can take place only with the support and participation of fishermen. Conservation of marine mammals can be achieved by integrating the agenda into fisheries regulatory mechanisms. The need to create awareness among fishermen and public on the importance of mammals in the marine ecosystems, their status and threats, and the need for conservation was also identified as a program which needs consideration.

Considering the major requirements for enhancing the effectiveness of conservation potential of marine mammals in Indian seas, four main objectives were proposed and the plan of work for achieving these was also charted out.

2. Objectives

The project objectives proposed were

1. Develop a comprehensive framework for reducing mortality of marine mammals due to fishery interactions;
2. Establish an nation-wide network for the recording of marine mammal stranding;
3. Develop a database for recording observed stranding of marine mammals and make it accessible to the public;
4. Produce appropriate material for creating and/or enhancing awareness in India about the role of marine mammals in marine ecosystems.

3. Methodology

3.1. Objective 1: Develop a comprehensive framework for reducing mortality of Marine mammals due to fishery interactions

Data on species wise marine mammal stranding was collected from the literature and the most common stranding location and species were identified.

Data on incidental catch in fishing gears was collected from the landing centres at Kochi, Mangalore, Mumbai, Veraval, Tuticorin, Mandapam, Chennai, Vishakapatnam and Puri. Apart from this, the technical staffs involved in recording the marine fish landing all along the Indian coast were also informed to report incidental catch or stranding, if any.

At the fish landing centres along Palk Bay and Gulf of Mannar detailed study was conducted by regular enquiry with fishermen to assess the magnitude of mortality of

marine mammals due to trapping in fishing gears. This region was selected mainly because of its importance as the major habitat of Dugong along the Indian coast.

Based on the analysis of the reports available, a framework for reducing mortality of marine mammals due to interactions with fishing operations was developed

3.2. Objective 2: Establish a nation -wide network for the recording of marine mammal stranding;

In 2001, Government of India listed all marine mammals under Wildlife (Protection) Act 1972 and all aspects related to these resources are dealt by the Department of Forest of each Maritime state. Hence to form the marine mammal stranding network in India, request letters to be a partner in the net work were sent to all the fisheries and forest departments of coastal states through Director, CMFRI. Subsequent to this it was planned to organize a workshop for the establishment of a network for the recording of marine mammal stranding. Scientists and technical staff of the Fishery Environment Management Division of CMFRI and selected scientists from other Fishery Divisions and Socio-economic Division were briefed about the need for having a database on marine mammal stranding / incidental catch in fishing gear.

3.3. Objective 3: Develop a database for recording observed stranding of marine mammals and make it accessible to the public

All existing records on stranding of marine mammals in India were collected and digitized.

- The database at hand at the time of planning the web interface for recording, reporting and recalling marine mammal stranding/ sighting was a single table in worksheet format with location and time tags apart from other details.
- Towards making the web interface more exhaustive and analytics friendly architecture of one dynamic mother table with a couple of near-static species and geographic location tables were made as the starting block. The focus thus was on making the mother table light on bandwidth whilst being accommodative on including as much visual media contents as possible.
- The primary key of the table was obviously a combination of spatial and time stamps. Upon an assessment of the database at hand it was found out that while the spatial tags were much more precise and homogenous, the time tags were not so consistent in granularity. Hence a ploy to have a hybrid granularity based key formulation was finalized for the web site.

- The first version of the site had a component of gridding comfort as regards spatial location search. As in few situations clustered grids might become the base for data searching analysis, the visual selection of grids, which got translated onto geographic locations with stranding records was made as the first step in the data extraction module. To further the filtering effort additional fields like the core resource field and sighting or stranding flags were also included.
- The resultant information was made in such a way as to form a table of occurrences as records and non-visual details as columns, which could be comfortably downloaded in popular worksheet, csv or rtf formats for further analytical processing.
- The data entry-cum-upkeep interface was designed with the hierarchical ease of obtained information as the foundation block. The location and time stamps notwithstanding, the resource descriptions in text followed by media details were lined up in easy to operate text boxes with handy file picker tools getting invoked upon clicking.
- Towards corroborating a better elucidation of the resources as well under focus, links to near static information and historic occurrences were juxtaposed with the basic palette of fresh information.
- For self-tutoring purposes, a detailed interactive presentations of each marine mammal species with all possible taxonomic, habit, habitat and feeding behavior details were also uploaded as a separate link in the database.
- Extensive plans were made to ensure the security and veracity of the data uploaded as well as sought. Without compromising on the credit given to the first information uploader, possibly the first person to accidentally observe, provisions were made for automated flagging of members of the Network who are the nearest to the occurrence of the incidence. This process of flagging was so seamlessly laid that possible follow-up actions like rescue etc. meant to be taken would get triggered. Three levels of user privileges, viz. Administrative/ Supervisory, chartered power user as well as guest user rights were framed and allotted to willing visitors.
- The communication was always planned to be two way between the observer and the office bearer and also two pronged, both through email and text/ sms services for ease of operability.

- The information thus stored was planned to be dished out to all needy 24x7 using a very short automated procedure of data dispensation.
- The users or guests have to use a one key credential to get to the menu showing the spatial and temporal data available for selection and register their request. The matching output would be mailed to the visitor with a text message intimating the dispatch of the email. To sum up it can be easily stated that the web interface was planned with two things at the core viz. ease of interchange and precision of information handled.

3.4.Objective 4: Produce appropriate material for creating and/or enhancing awareness in India about the role of marine mammals in marine ecosystems.

Material for poster preparation was gathered and awareness material prepared for different categories of stakeholders like students, researchers and villagers. It was also planned to organize workshop for creation of awareness for the protection of marine mammals and the formulation of the framework of a National Plan of Action – Marine Mammals.

For easy visualization of the stranding locations and for making it more visible to the general public, map depicting the stranding locations of marine mammals along the Indian coast was prepared. An interactive web map was also prepared with the reported stranding locations, so that it could be hosted in a website making it more easily accessible to the public

4. Results

4.1. Stranding of marine mammals

The records of the stranded marine mammals along the Indian coast were collected and the data analyzed. It was found that 25 species consisting of 5 baleen whales, 4 toothed whales, 14 dolphins and one each of finless porpoise and sea cow have been reported during the 216 year period from 1800 to 2016. However, stranding of six species Fin whale, Killer whale, False Killer whale, long-beaked common dolphin, Irrawaddy dolphin, Melon-headed whale were not observed during the this century. Details pertaining to this are given below.

4.1.1. Rate of stranding

The number of stranding records was only 21 during the period 1800 to 1889 (Fig.1; Table 1) while it increased to 243 in the succeeding century and during the 16 years since 2000, 115 stranding have been reported. Poor means of communication and low accessibility to coastal regions may be the reason for low stranding records during the 19th century. The stranding rate which was low, 0.2 per year (ie. one stranding in every 5 year) increased to 2.4 per year in 20th century and currently the rate is 7.2 per year (Fig.1). This is alarming and urgent measures have to be taken to prevent and control this. Since these are records of stranding being reported, the actual number of animals stranded is much higher, since in some cases it is mass stranding and that of mother and calf.

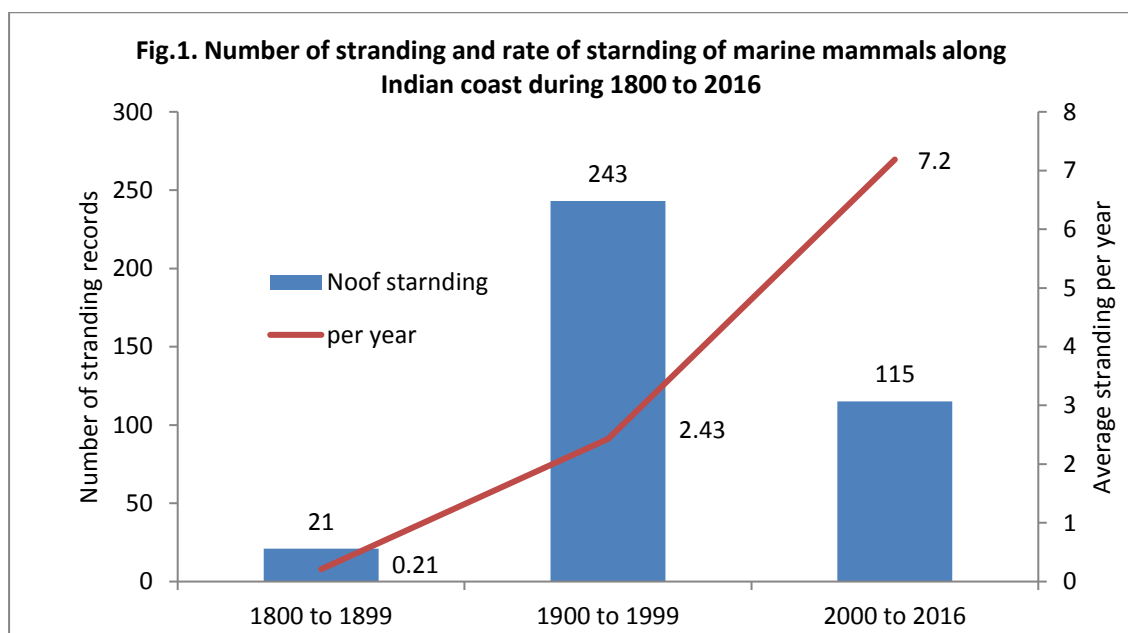
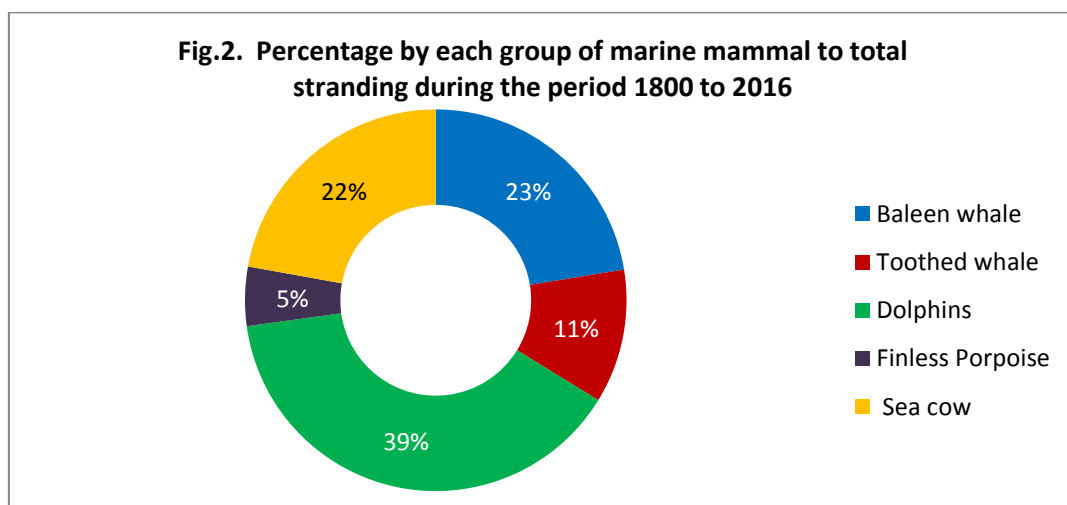


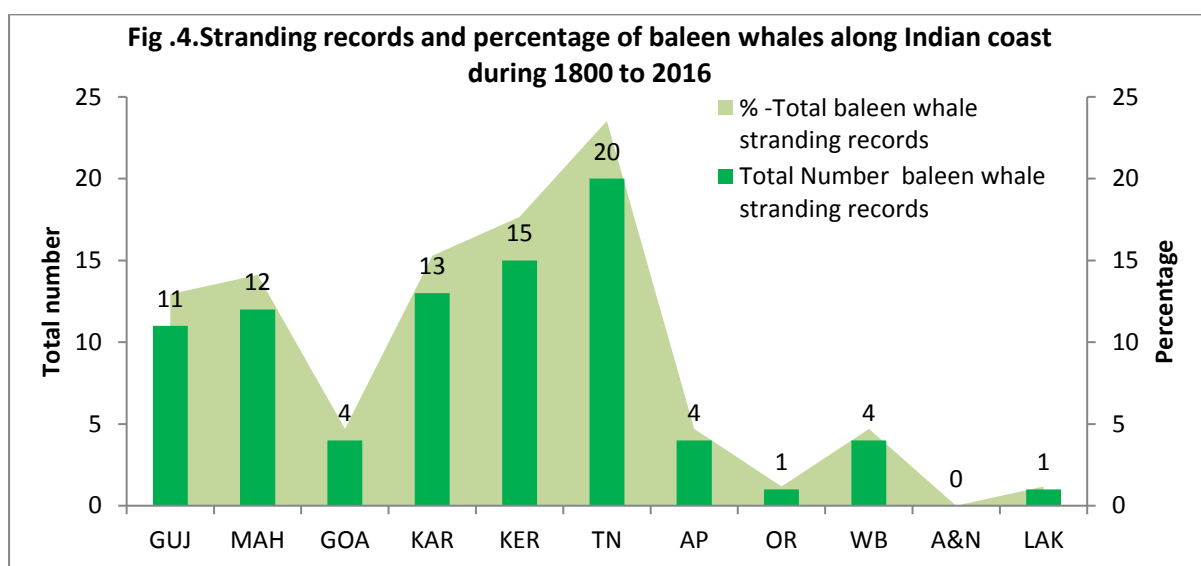
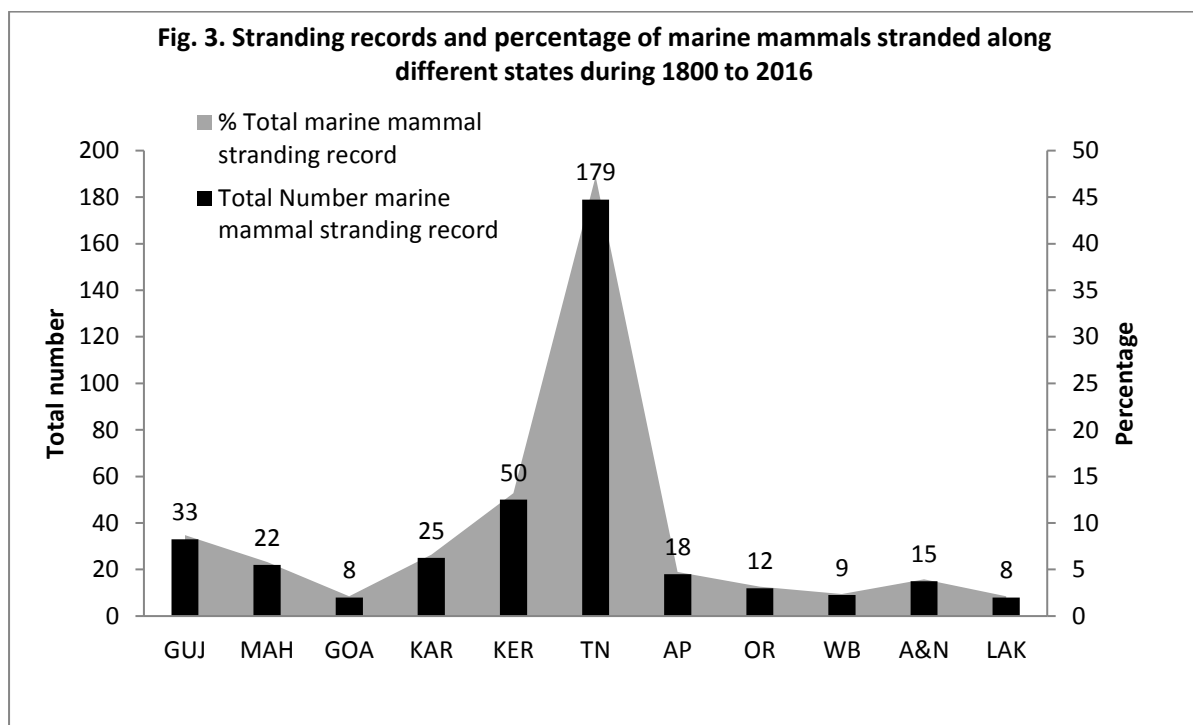
Table 1: Details of marine mammals stranded before 1900 along Indian coast

	Common name	Scientific name	Year	State
1	Indo-Pacific Humpback Dolphin	<i>Sousa plumbea</i>	1800	MAH
2	Indo-Pacific Humpback Dolphin	<i>Sousa plumbea</i>	1827	KER
3	Finless Porpoise	<i>Neophocaena phocaenoides</i>	1827	KER
4	Finless Porpoise	<i>Neophocaena phocaenoides</i>	1866	TN
5	Indo-Pacific Bottlenose Dolphin	<i>Dolphin Tursiops aduncus</i>	1846	KER
6	Indo-Pacific Bottlenose Dolphin	<i>Dolphin Tursiops aduncus</i>	1848	WB
7	Short-finned Pilot Whale	<i>Globicephala macrorhynchus</i>	1852	WB
8	Irrawaddy Dolphin	<i>Orcaella brevirostris</i>	1852	AP
9	Dwarf Sperm Whale	<i>Kogia simus</i> Owen, 1866	1853	AP
10	Melon-headed	<i>Peponocephala electra</i>	1853	TN
11	Indo-Pacific Humpback Dolphin	<i>Sousa plumbea</i>	1854	AP
12	Finless Porpoise	<i>Neophocaena phocaenoides</i>	1866	TN
13	Bryde's Whale	<i>Balaenoptera edeni</i>	1871	WB
14	Blue whale	<i>Balaenoptera musculus</i>	1874	KAR
15	Indo-Pacific Bottlenose Dolphin	<i>Dolphin Tursiops aduncus</i>	1883	AP
16	Rough-toothed Dolphin	<i>Steno bredanensis</i>	1889	A&N
17	Pantropical Spotted Dolphin	<i>Stenella attenuata</i>	1889	WB
18	Blue whale	<i>Balaenoptera musculus</i>	1890	KER
19	Sperm Whale	<i>Physeter macrocephalus</i>	1890	TN
20	Melon-headed	<i>Peponocephala electra</i>	1891	TN
21	Indo-Pacific Humpback Dolphin	<i>Sousa plumbea</i>	1894	MAH

Group-wise stranding: Among the five groups highest stranding was of dolphins (39%) followed by baleen whales (23%), sea cow (22%), toothed whales (11%) and finless porpoise (5%) (Fig 2).

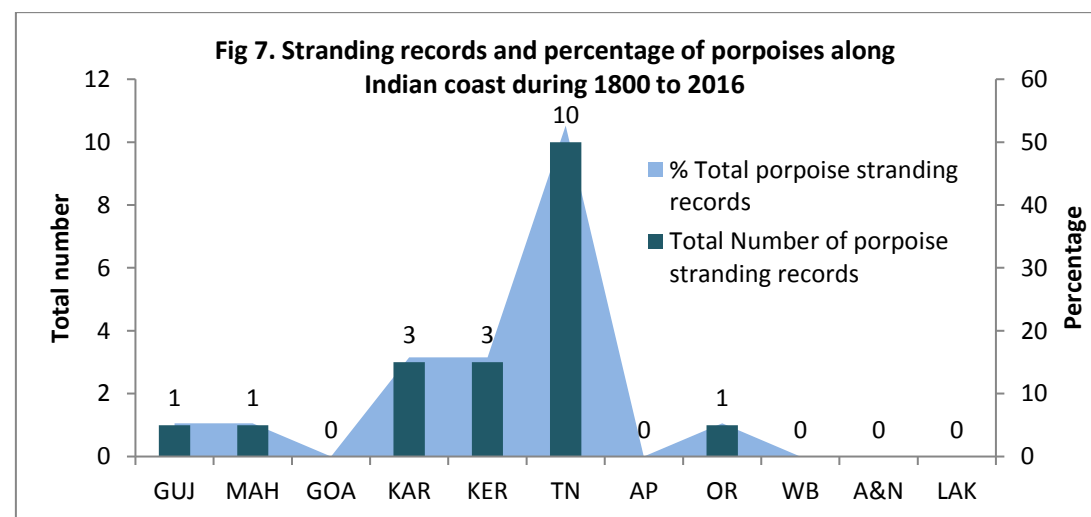
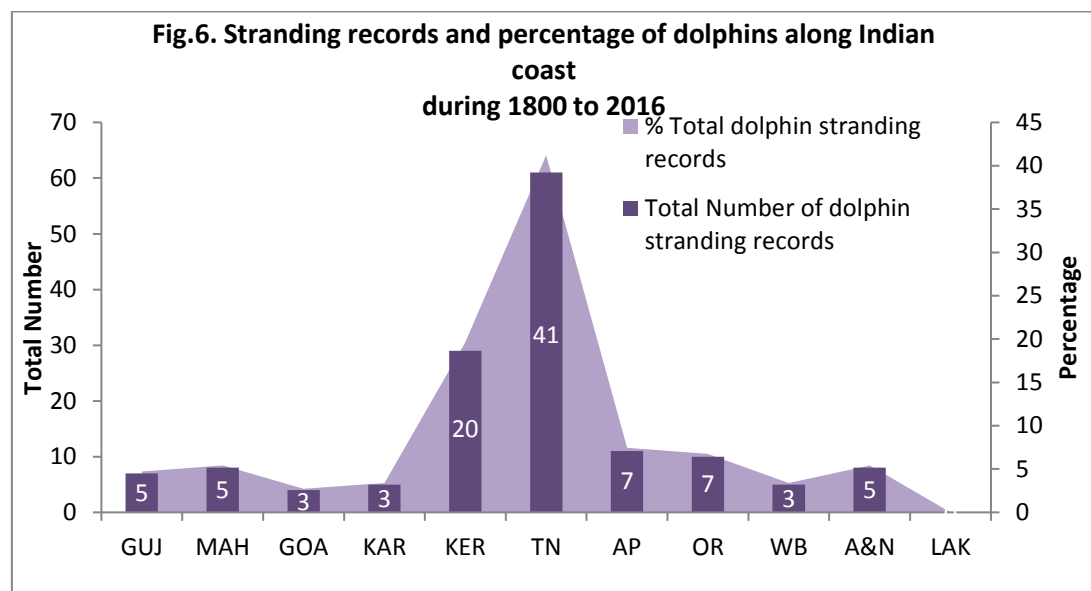
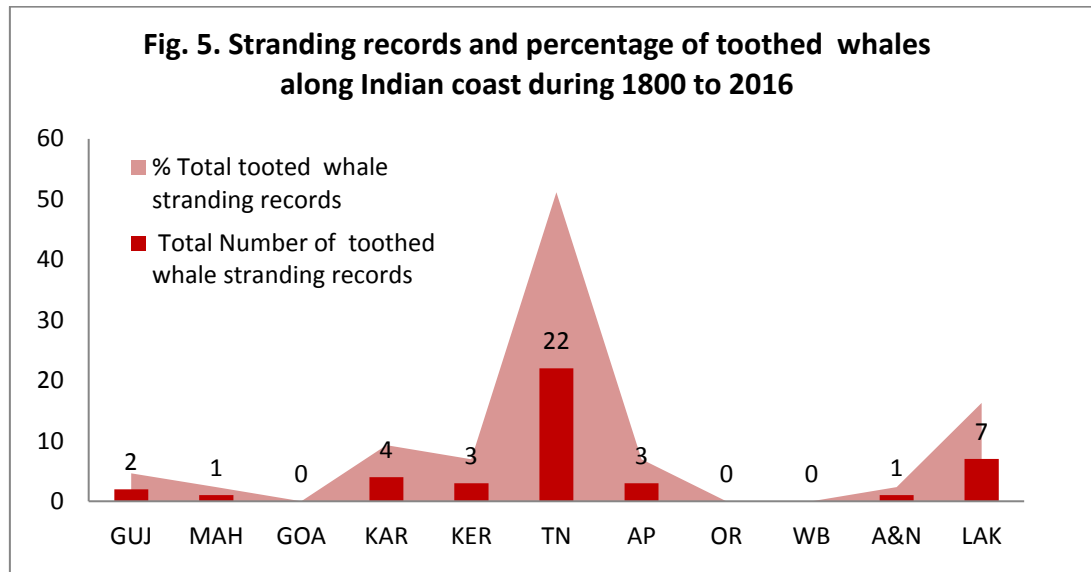


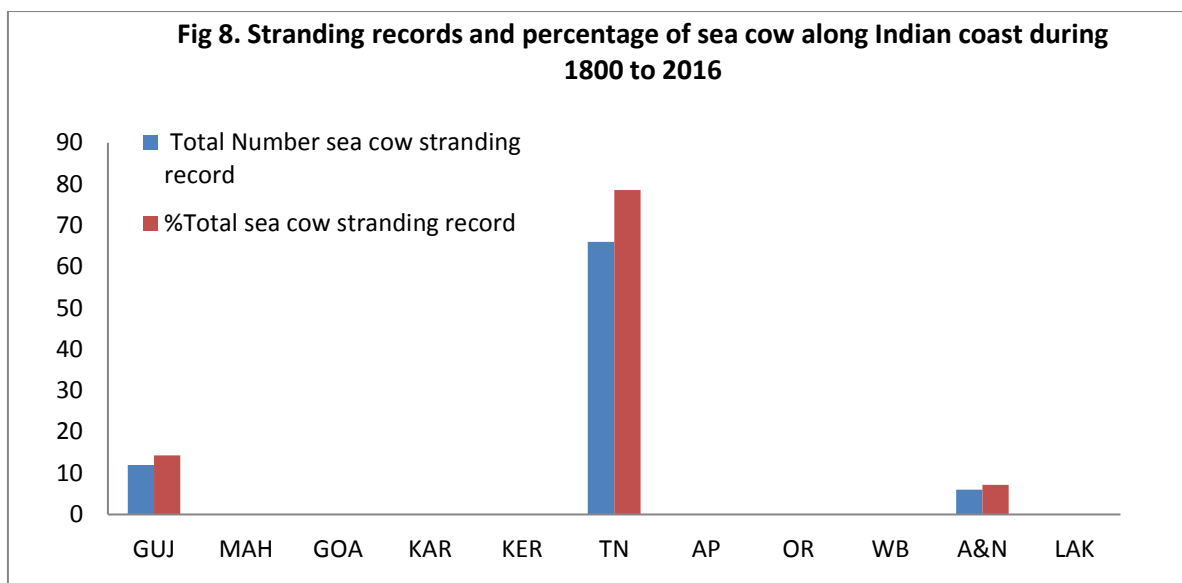
Highest stranding of all groups was in Tamil Nadu (Fig.3). The stranding of **baleen whales** was high in all the maritime times along west coast except Goa, while along east coast (except Tamil Nadu), the stranding records were low (Fig 4).



Stranding of toothed whales was highest, slightly more than 50% along Tamil Nadu coast followed by Lakshadweep Islands (16%)(Fig 5). They were absent in Goa, Orissa and West Bengal. Dolphin stranding was reported all along the Indian coast except Lakshadweep Islands and was highest in Tamil Nadu (41%), followed by Kerala (20%)(Fig 6). Porpoise stranding was reported from all the states along west coast except Goa(Fig 7). Along Kerala and Karnataka, almost same number of reports on Porpoise stranding has been observed (16% each). Along east coast, apart from Tamil Nadu (53%), stranding was not observed in other maritime states except in Orissa. Stranding of porpoises was not observed in the

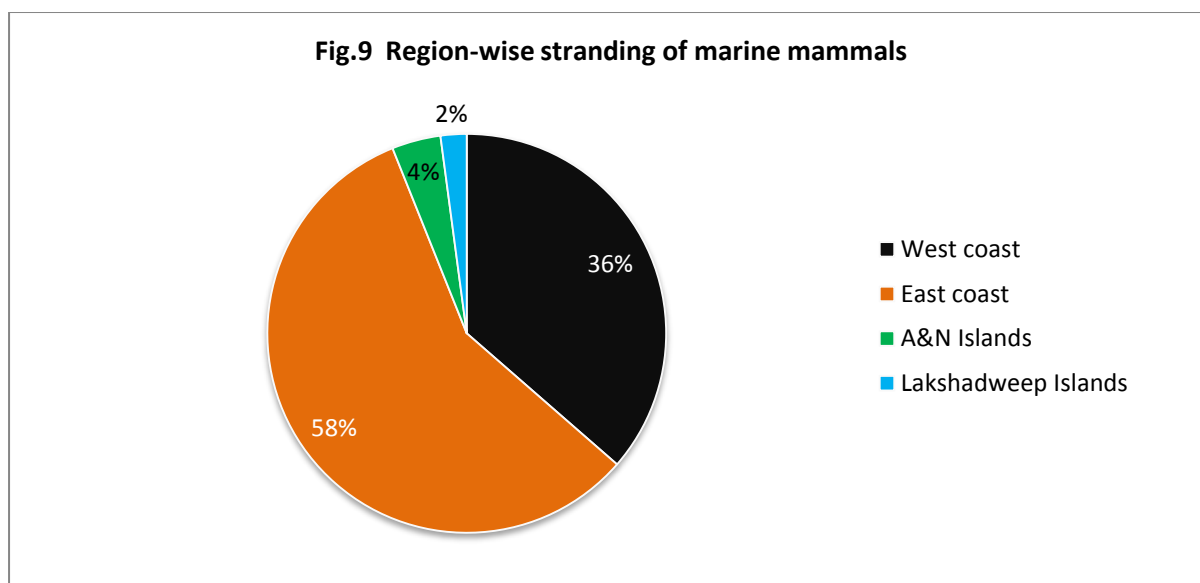
Island territories. Dugong stranding was observed only from states which have sea grass habitats; Tamil Nadu (79%), Gujarat (14%) and A&N islands (7%) (Fig 8).



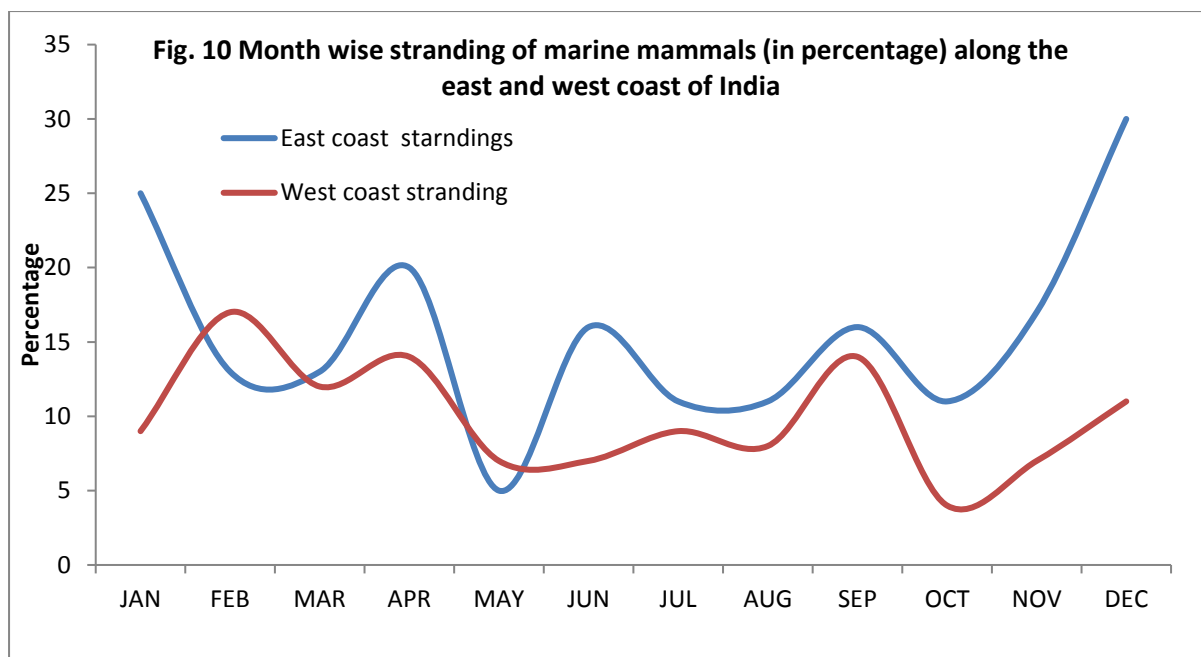


4.1.2. East coast vs West coast.

Stranding were more along the east coast (58%) than the west coast (36%) and comparatively higher in A&N islands than Lakshadweep group of Islands (Fig.9). The southeast and southwest coasts have more stranding than other regions. The stranding along East coast was found to be higher during December and January while along the west coast it was during Feb, April and September (Fig. 10)

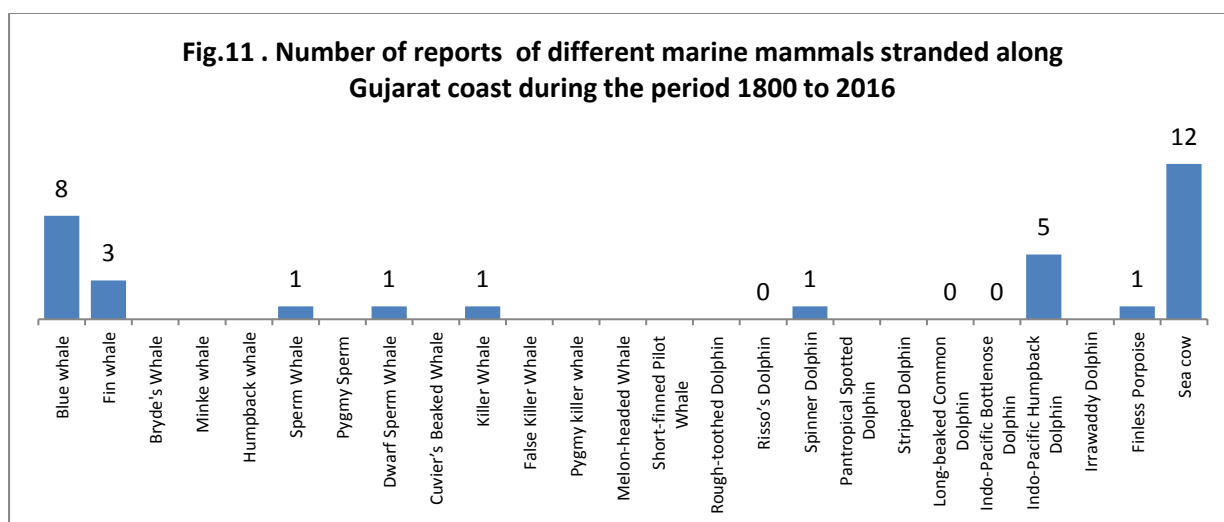


Among the maritime states, Tamil Nadu recorded the highest stranding (Fig.3), 179 records (47%) followed by Kerala (13%) and Karnataka (7%). Maharashtra and Gujarat had higher stranding than other states of east coast - Andhra Pradesh, West Bengal and Orissa. Goa had the lowest record of stranding. A&N had 15 records while from Lakshadweep, only 8 records have been reported.



Gujarat:

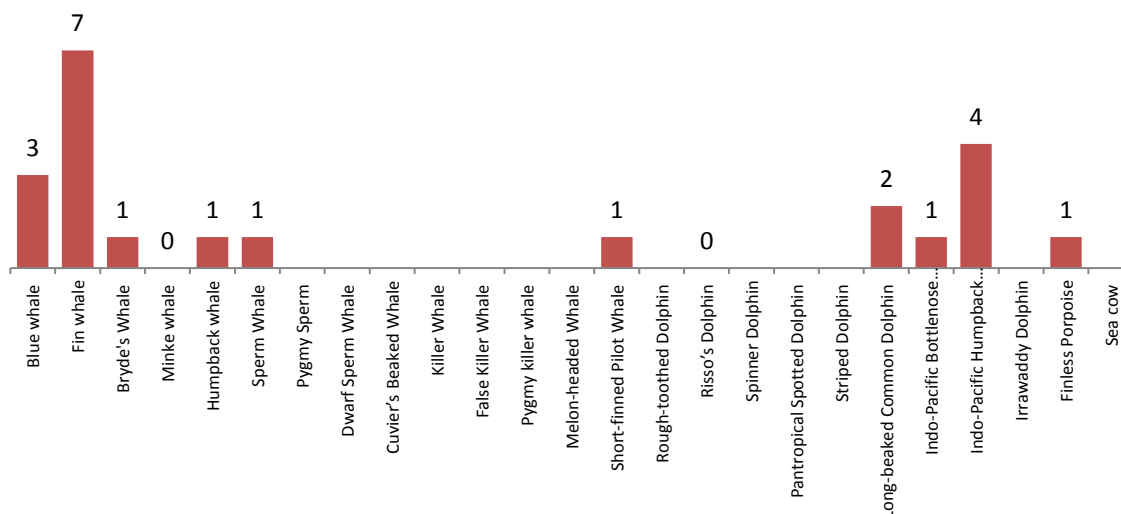
The first stranding report from Gujarat was that of a blue whale in 1939 and there are 33 records of 9 species of which dugong stranding is highest followed by blue whale and Indo Pacific humpback dolphin (Fig 11). Gujarat is one of the states which have dugongs and efforts should be made to conserve and build this stock and assess the health of sea grass beds.



Maharashtra

Along Maharashtra coast about 22 stranding records of 10 different species have been reported of which the highest is that of Fin whale (7 NOS) (Fig 12) and the first record of 19th century on stranding was that of Indo-Pacific Humpback Dolphin, *Sousa plumbea* in 1800 (Table1).

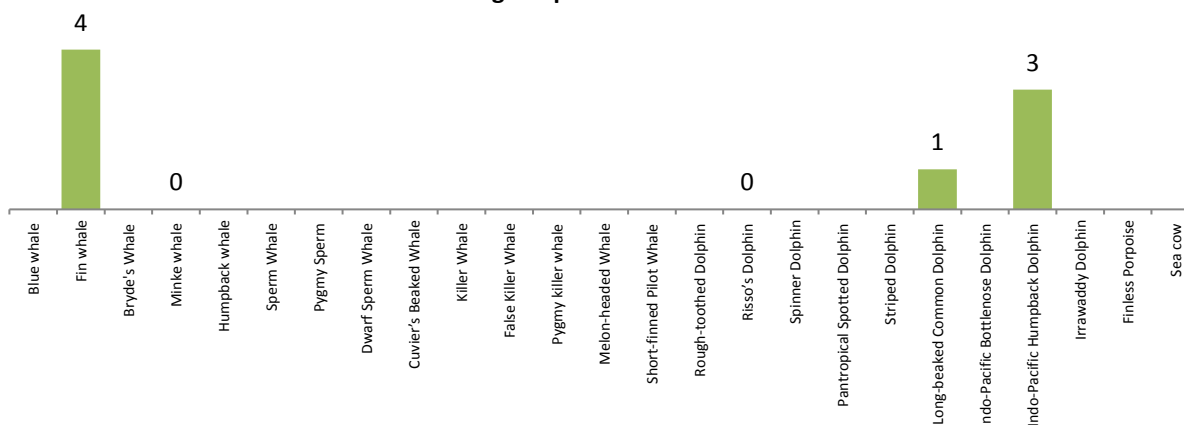
Fig.12. Number of reports of different marine mammals stranded along Maharashtra coast during the period 1800 to 2016



Goa

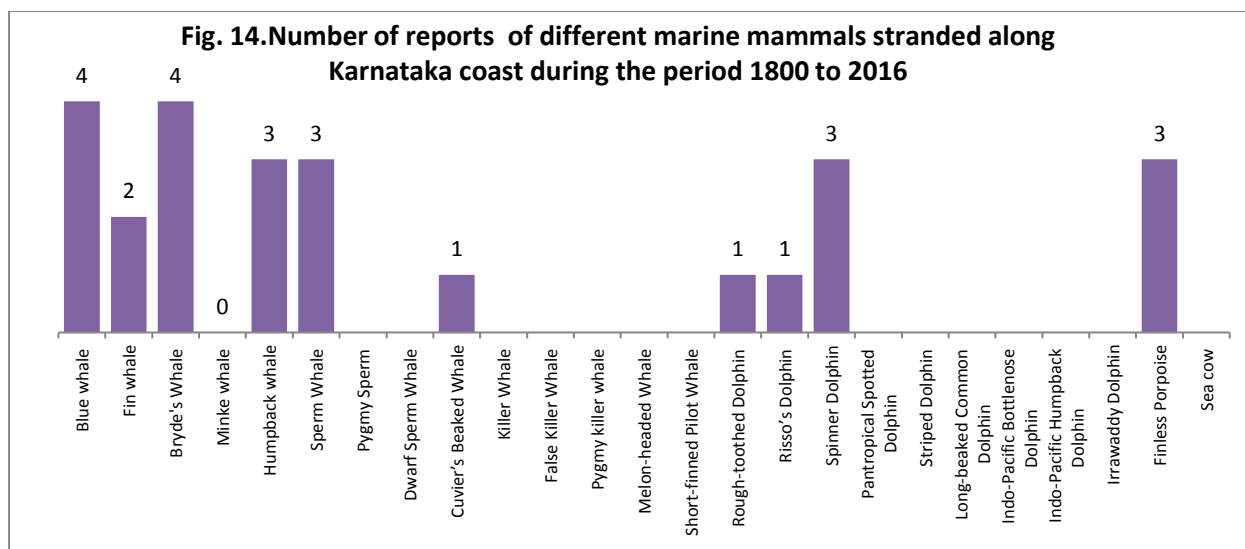
Along Goa coast strandings have been low, only 8 nos. of which Fin whale was the highest, followed by Indo Pacific humpback dolphin (3 nos.) and long beaked common dolphin (Fig. 13). These were the only three species reported so far. The first report was in 1968 and the last in 2002.

Fig. 13. Number of reports of different marine mammals stranded along Goa coast during the period 1800 to 2016



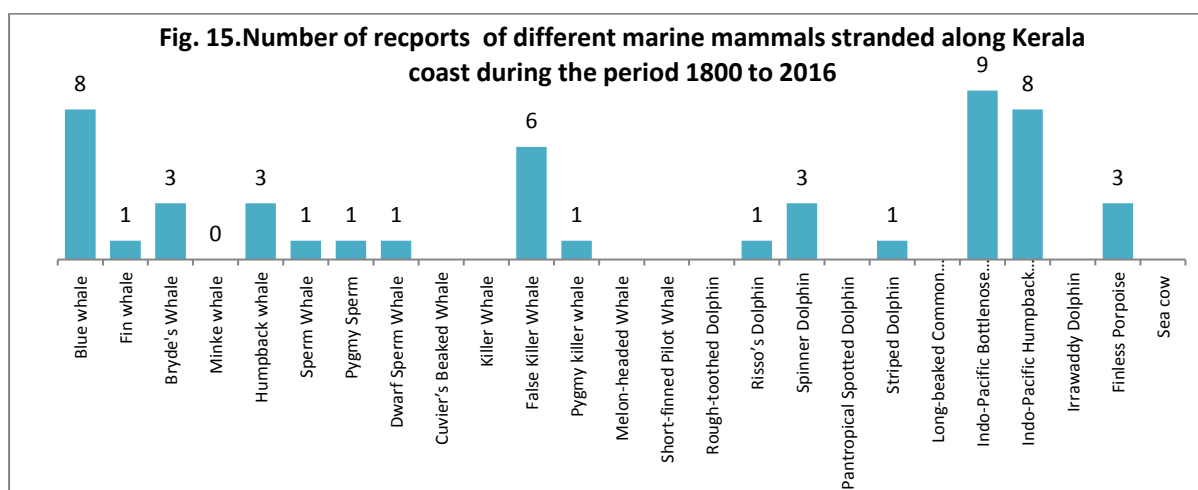
Karnataka

The first stranding report in Karnataka was that of the Blue whale, *Balaenopterus musculus* in 1874. About 22 strandings of 10 species have been reported including 4 out of the five baleen whales (Fig 14). Comparatively higher stranding of finless porpoise was recorded along Karnataka and Kerala than other states.



Kerala

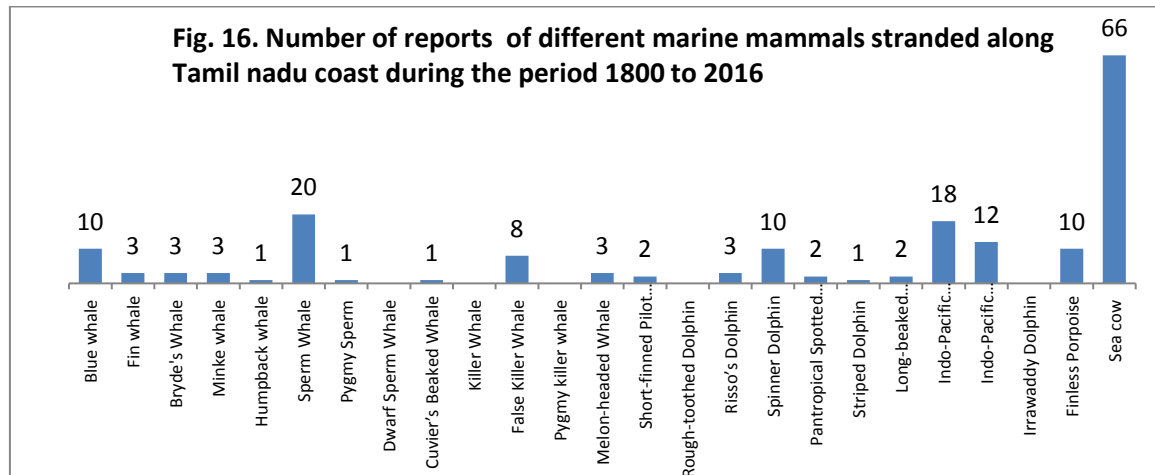
Kerala has the highest stranding record along the west coast, 50 reports of 15 species. The first records were in 1827 with reports of Indo-Pacific Humpback Dolphin *Sousa plumbea* and Finless Porpoise *Neophocaena phocaenoides* being stranded along the Malabar Coast of Kerala. The coast has reports of 16 records of baleen whales (Fig.15). The comparatively higher small pelagic resources and plankton blooms due to the upwelling may be the reason for these resources to move towards the coast. Awareness on marine mammal stranding and rescue is urgently needed.



Tamil Nadu

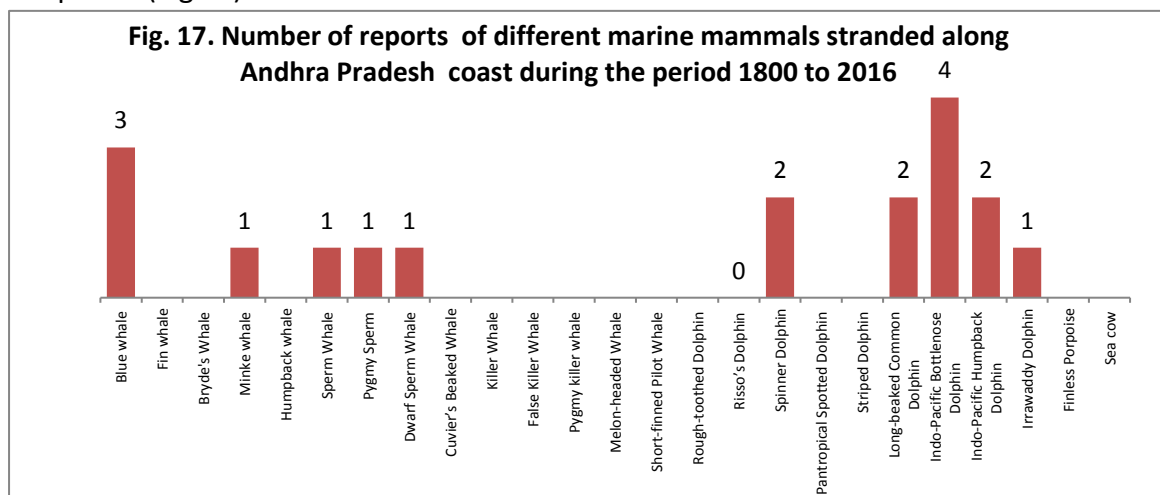
The first stranding report from Tamil Nadu was that of *Neophocaena phocaenoides* in 1866 off Chennai coast. With a rich diversity of marine mammals (20 species), Tamil Nadu tops all the states in reporting stranding of marine mammals, with 159 records including all species of baleen whales reported along Indian coast, sea cow, porpoise, 3 species of toothed whales and 10 species of dolphins (Fig.16). This coast has witnessed some of the rare mass stranding records of Short finned pilot whales along the Indian coast. There is a need to

educate the public on rescue operations during mass stranding and a need to develop basic facilities required to carry out such operations in emergency situations. One alarming situation is the high stranding records of dugong (66 nos.) in Gulf of Mannar and Palk Bay. Clearly this indicates the need to identify the reasons, improve the sea grass beds and make efforts to increase the population of sea cow along the Tamil Nadu coast.



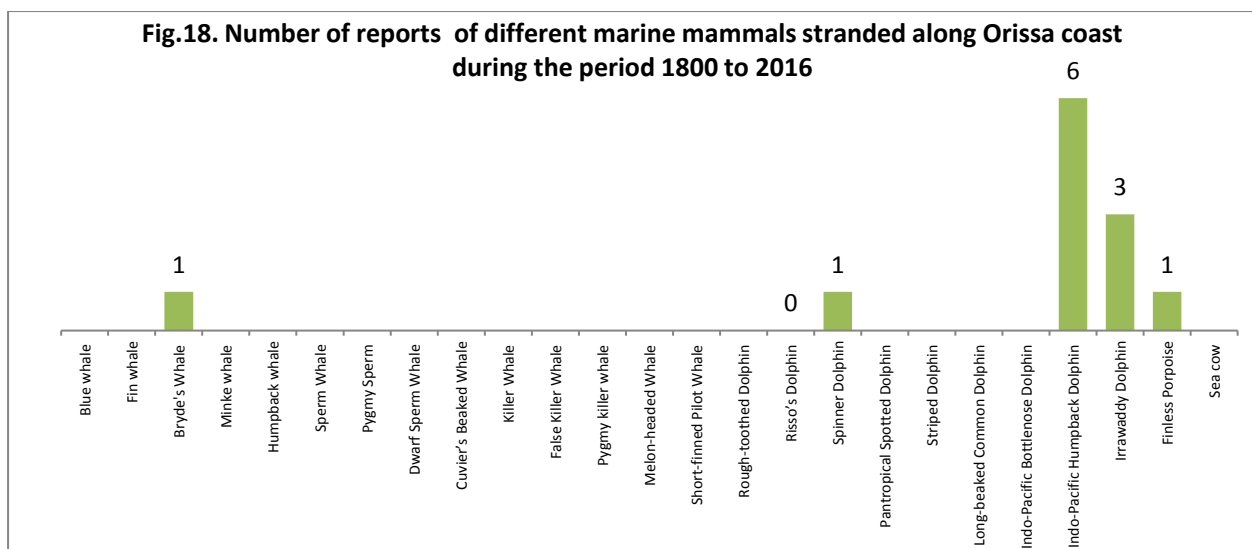
Andhra Pradesh

The earliest record of stranding was that of Irrawaddy Dolphin, *Orcaella brevirostris* in 1852 followed by dwarf Sperm Whale *Kogia simus*, 1853 and Indo-Pacific Humpback Dolphin, *Sousaplumbea* in 1854. The stranding were lower, compared to Tamil Nadu and consisted of 10 species (Fig 17).



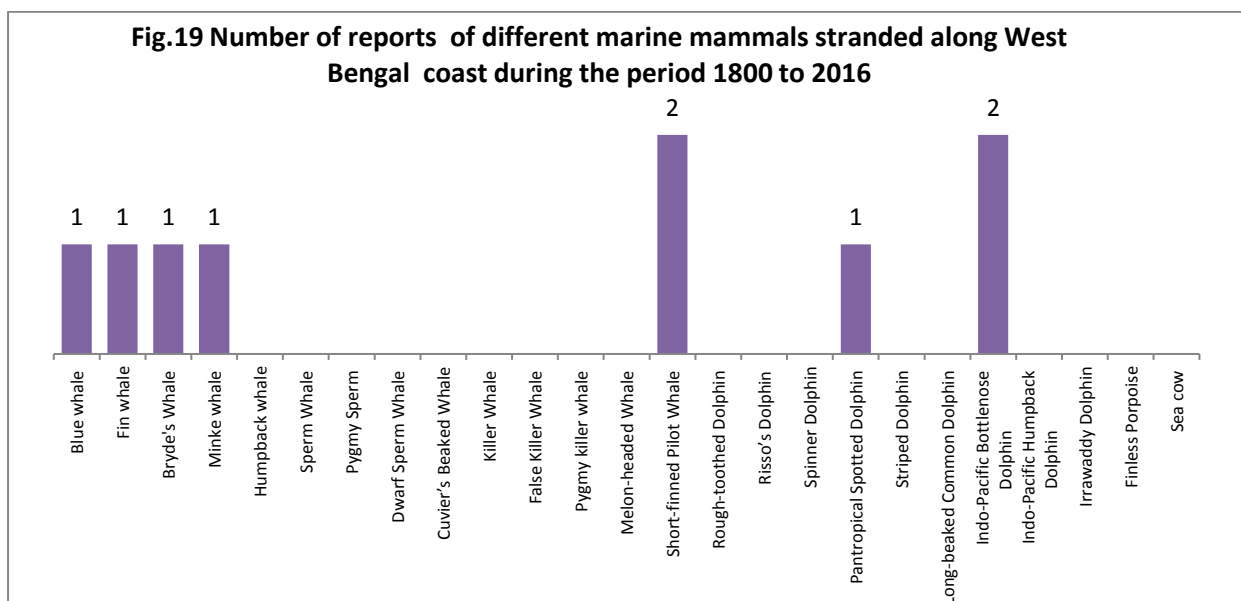
Orissa

Along Orissa coast, the number of stranding reports are low, comprising 5 species and the first report was in 1983 on the Indo Pacific humpback dolphin, *Sousa plumbea*. Only one baleen whale, 3 species of dolphins and one finless porpoise have been reported (Fig.18). No records of toothed whales reported here.



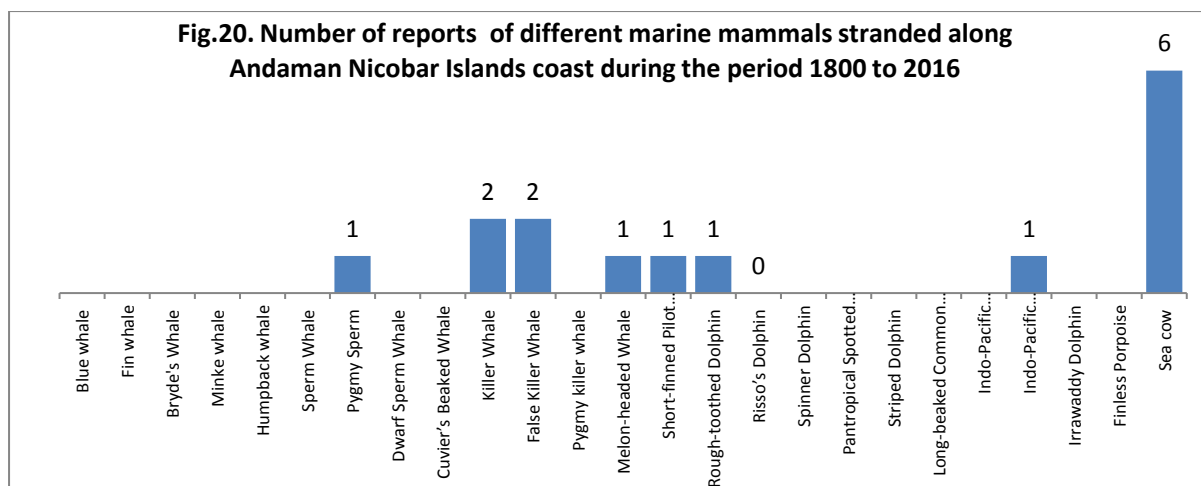
West Bengal

The first stranding report was that of Indo-Pacific Bottlenose Dolphin, *Tursiops aduncus* in 1848 followed by that of Short-finned Pilot Whale *Globicephala macrorhynchus* in 1852. A total of 9 stranding of 4 species of baleen whales and 3 species of dolphins have been reported (Fig.19). No records of toothed whales and porpoises and sea cows.



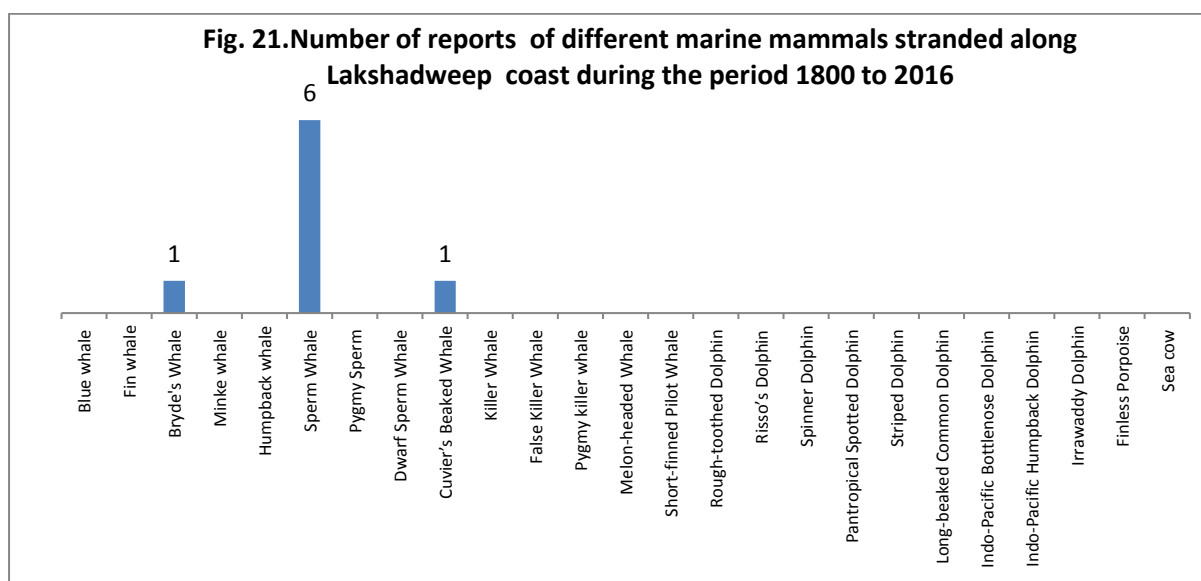
A& N islands

The first stranding record was that of Rough-toothed Dolphin, *Steno bredanensis* in 1889. There were 14 stranding of 8 species mostly of dolphins (6 species) and one species of toothed whale and sea cow (Fig.20). There are no reports of baleen whales and porpoises from A&N Islands. Mass strandings and numerous dugong strandings have been observed here, indicating the need for awareness on rescue operations.



Lakshadweep Islands

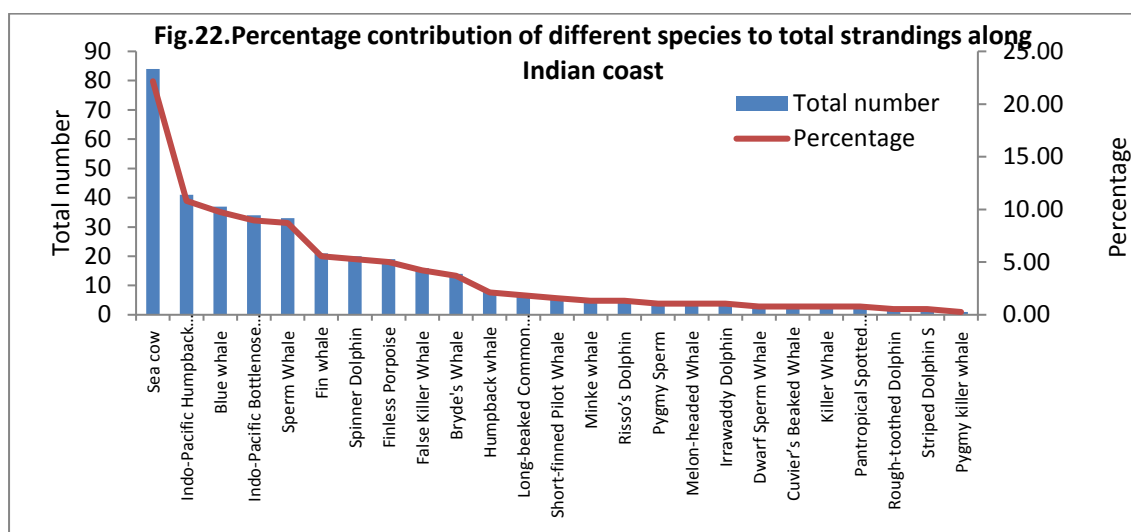
The first stranding record was that of Sperm Whale, *Physeter macrocephalus* 1971. The no of stranding reports are very low, 8 nos. and the most common was that of sperm whale (6nos) followed by Brydes whale and Cuviers beaked whale (Fig 21). There are no reports of dolphins, porpoises and sea cows. The Laccadive seas are known to be rich in tunas and squids which form the favourite food of some species of marine mammals.



4.1.3. Major species stranded

An analysis of the number of strandings of different species was carried out and it observed that some species are more frequently stranded than others. The most common species stranded was the dugong (22%) along Tamil Nadu, Gujarat and A&N Islands. Since this species has restricted distribution, it is important to identify the reasons for stranding and reduce such incidence. The second major species is the Indo-Pacific Humpback Dolphin which has been reported from all states except Karnataka and West Bengal and in the islands of Lakshadweep. Other species which have formed more than 10% of the stranding

are Blue whale, Indo-Pacific bottlenose dolphin, Sperm whale, Fin whale, Spinner dolphin, finless porpoise, False Killer Whale and Bryde's Whale (Fig22).



4.1.4. Fishing related mortality

Records on entanglement of marine mammals in fishing gears were collected and analysed. It was observed that gill nets are responsible for 98.8% of the mortalities. Occasional reports on incidental catch / entanglement in trawl, purse seine, shore seine and long line has also been recorded. This became a problem from 1970s though the first report in 1953 was that of an incidental catch of porpoise in a dol net along Gujarat.

Porpoises:

A total of 45 porpoises have been found to be caught by fishing nets along Karnataka (34nos), Kerala (9nos; from gill nets) and one each from Gujarat (dol net) and Tamil Nadu (gill net) (Table. 2). Of the 34 nos. from Karnataka, 32 were from gill net and 2 from purse seines. Surveys conducted in Kerala and Karnataka indicate that the porpoises continue to get entangled in gill nets in Karnataka and though this creates problem for the fishermen whose nets get torn, they release them back to the sea most often.

Table 2. Entanglement of Finless porpoise in different gears						
		GN	DOL	PS	Total	Period of reporting
KER		9			9	1973-76
GUJ			1		1	GN-1959 -2013; PS-2003
KAR		32		2	34	2001
TN		1			1	1992
		42	1	2	45	
Percentage		93.3	2.2	4.4	100.0	

Dolphins:

From 1976 to 2013, about 766 entanglements / incidental catch of dolphins in fishing gears has been reported from Karnataka, Kerala, Tamil Nadu and Andhra Pradesh (Table 2).

Seven species of dolphins, such as Spinner Dolphin (275nos), Long-beaked Common Dolphin (237 nos.), Indo-Pacific Bottlenose Dolphin (177 nos.), Indo-Pacific Humpback Dolphin (64nos.), Rough-toothed Dolphin (8 nos.), Risso's Dolphin (4 nos.) and Pantropical Spotted Dolphin (1 no) were reported in the fishing gear related mortality along the Indian coast (Fig 23). Spinner Dolphins were reported in all the four south Indian states while others were mostly caught along the Kerala –Tamil Nadu fishing gear operations (Table 4).

Highest fishing related mortality were reported from Kerala (526 nos.) followed by Tamil Nadu (231 nos.). In Karnataka fishing related mortality was low (2 nos); spinner dolphin and Indo Pacific humpback dolphin one each. Only one species has been reported from Andhra Pradesh Spinner dolphin (5 nos.) and from A& N islands, beaked common dolphin has been reported.

During this century, the number of dolphin species reported in fishing related mortality reduced to four; only species such as Risso's Dolphin, Spinner Dolphin, Indo Pacific humpback dolphin Pantropical spotted dolphin have been reported.. Entanglement of porpoises has been reported from Karnataka and Gujarat during this century.

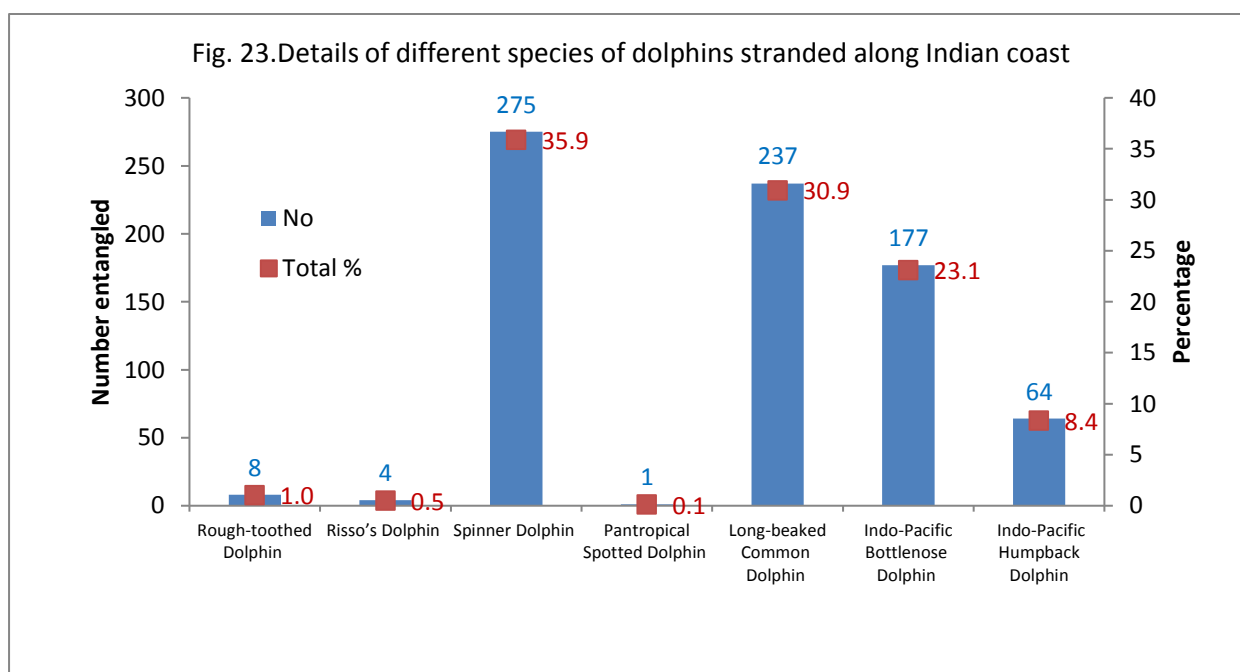


Table 3.State-wise records of number of dolphins entangled in different fishing gears								
				Gear-wise entanglement (No)				
			Total no	Gill Net	Shore seine	Trawl net	Long line	Period
Rough-toothed Dolphin	<i>Steno bredanensis</i>	TN	8	8	0	0	0	1982 -1989
Risso's Dolphin	<i>Grampus griseus</i>	KER	1		1	0	0	1998
Risso's Dolphin	<i>Grampus griseus</i>	TN	3	3	0	0	0	2004-2005
Spinner Dolphin	<i>Stenella longirostris</i>	KER	92	92	0	0	0	1976 -1980
Spinner Dolphin	<i>Stenella longirostris</i>	TN	177	177	0	0	0	1982-2004
Spinner Dolphin	<i>Stenella longirostris</i>	AP	5	5	0	0	0	2012
Spinner Dolphin	<i>Stenella longirostris</i>	KAR	1	1	0	0	0	2013
Pantropical Spotted Dolphin	<i>Stenella attenuata</i>	TN	1	1	0	0	0	2004
Long-beaked Common Dolphin	<i>Delphinus capensis</i>	KER	236	236				1976 -1987
Long-beaked Common Dolphin	<i>Delphinus capensis</i>	A&N	1				1	1979
Indo-Pacific Bottlenose Dolphin	<i>Tursiops aduncus</i>	KER	140	140				1976-1986
Indo-Pacific Bottlenose Dolphin	<i>Tursiops aduncus</i>	TN	37	30		7		1982
Indo-Pacific Humpback Dolphin	<i>Sousa plumbea</i>	KER	57	57				1977-1986
Indo-Pacific Humpback Dolphin		TN	5	5				1990-2004
Indo-Pacific Humpback Dolphin		KAR	2	2				2005
Total entanglements			766	757	1	7	1	
	Percentage			98.83	0.13	0.91	0.13	

Table :4. Number of dolphins entangled in fishing gears

		KAR	KER	TN	AP	A&N	Total
Rough-toothed Dolphin	<i>Steno bredanensis</i>			8			8
Risso's Dolphin	<i>Grampus griseus</i>		1	3			4
Spinner Dolphin	<i>Stenella longirostris</i>	1	92	177	5		275
Pantropical Spotted Dolphin	<i>Stenella attenuata</i>			1			1
Long-beaked Common Dolphin	<i>Delphinus capensis</i>		236			1	237
Indo-Pacific Bottlenose Dolphin	<i>Tursiops aduncus</i>		140	37			177
Indo-Pacific Humpback Dolphin	<i>Sousa plumbea</i>	2	57	5			64
		3	526	231	5	1	766
Percentage entanglement							
		KAR	KER	TN	AP	A&N	
Rough-toothed Dolphin	<i>Steno bredanensis</i>	0	0	3	0	0	
Risso's Dolphin	<i>Grampus griseus</i>	0	0	1	0	0	
Spinner Dolphin	<i>Stenella longirostris</i>	33	17	77	100	0	
Pantropical Spotted Dolphin	<i>Stenella attenuata</i>	0	0	0	0	0	
Long-beaked Common Dolphin	<i>Delphinus capensis</i>	0	45	0	0	100	
Indo-Pacific Bottlenose Dolphin	<i>Tursiops aduncus</i>	0	27	16	0	0	
Indo-Pacific Humpback Dolphin	<i>Sousa plumbea</i>	67	11	2	0	0	
		100	100	100	100	100	

In Kerala, information on incidental catch of cetaceans in fishing gears from major landing centres like Munambam, Chavakkad, and Ponnai, landing centre were collected. One finless porpoise and 2 Indo-Pacific Humpbacked dolphins was reported to be entangled during the period.

From Karnataka, monitoring was done at Mangalore fishing harbor which is one of the major fishing centres, where incidental catch of marine mammal is reported to land at regular interval. A total of 12 individuals of three species namely *Neophocaena phocaenoides*, *Stenella longirostris* and *Sousa plumbea* were observed as incidental bycatch landing in this centre. Gillnet is the major gear for incidental catch, as in other parts of India followed by purse seine.

4.1.5. Fishermen interaction

Surveys conducted among fishermen have indicated that they feel that dolphin population has increased and this has negatively affected their fishing activities. Damage to gear and

expenses to mend this is a problem cited by gill netters of south India. Fishermen from southwest coast of India have suggested that culling of dolphins should be done to avoid damage to nets.

4.2. Network for the recording of marine mammal stranding

To form the marine mammal stranding network in India, request letters were sent to all the fisheries and forest departments of coastal states through Director, CMFRI. Most of the coastal states government have nominated their officials. Apart from this, staff of CMFRI in all maritime states, scientists from other organizations, members of Village groups and NGOs have been included. A total of 99 members have been identified and the total number for each State/UT are Gujarat-4, Maharashtra-10, Goa-6, Karnataka-8, Kerala-8, Tamil Nadu-29, Andhra Pradesh-18, Odisha-6, West Bengal-3, Lakshadweep Islands-1 and Andaman Nicobar Islands-6

The details of state coordinators and others are willing to participate in the 'Indian Marine Mammal Network' are given in **Annexure-1**.

4.3 Databases for recording observed stranding of marine mammals and make it accessible to the public

All existing records on stranding of marine mammals in India were collected and digitized. The stranding and sighting details of Indian marine mammals have been collected and maintained by CMFRI. More than 90% of stranding records are reported by the CMFRI Staff. The stranding details collected from the different source are given in Annexure- 2. The web portal developed with "Search" and "Share" mode of interaction will be placed as a link/page in CMFRI website due to lack of funds.

Based on the collected information, the conservation status of Indian marine mammals was classified based on IUCN Red list criteria and the results are given in Table. 5.

Table5. Marine mammals of India & Conservation Status

No	Common Name	Species name	IUCN Status	India Status*
1.	Blue whale	<i>Balaenoptera musculus</i> (Linnaeus, 1758)	Endangered	Endangered
2.	Fin whale	<i>Balaenoptera physalus</i> (Linnaeus, 1758)	Endangered	Endangered
3.	Bryde's whale	<i>Balaenoptera edeni</i> Anderson, 1878	Data Deficient	Data Deficient
4.	Common Minke whale	<i>Balaenoptera acutorostrata</i> Lacépède, 1804	Least Concern	Data Deficient
5.	Humpback whale	<i>Megaptera novaeangliae</i> (Borowski, 1781)	Least Concern	Data Deficient
6.	Sperm whale	<i>Physeter macrocephalus</i> Linnaeus, 1758	Vulnerable	Vulnerable
7.	Pygmy sperm whale	<i>Kogia breviceps</i> (de Blainville, 1838)	Data Deficient	Data Deficient
8.	Dwarf sperm whale	<i>Kogia sima</i> (Owen, 1866)	Data Deficient	Data Deficient
9.	Cuvier's beaked whale	<i>Ziphius cavirostris</i> Cuvier, 1823	Least Concern	Data Deficient
10.	Indo-Pacific beaked whale	<i>Indopacetus pacificus</i> (Longman, 1926)	Data Deficient	Data Deficient
11.	Short-finned pilot whale	<i>Globicephala macrorhynchus</i> Gray, 1846	Data Deficient	Data Deficient
12.	Killer whale	<i>Orcinus orca</i> (Linnaeus, 1758)	Data Deficient	Data Deficient
13.	False killer whale	<i>Pseudorca crassidens</i> (Owen, 1846)	Data Deficient	Data Deficient
14.	Pygmy killer whale	<i>Feresa attenuate</i> Gray, 1874	Data Deficient	Data Deficient
15.	Melon-headed whale	<i>Peponocephala electra</i> (Gray, 1846)	Least Concern	Data Deficient
16.	Irrawady dolphin	<i>Orcaella brevirostris</i> (Gray, 1866)	Vulnerable	Vulnerable
17.	Indo-Pacific humpbacked dolphin	<i>Sousa plumbea</i> (Osbeck, 1765)	Near Threatened	Least Concern
18.	Rough-toothed dolphin	<i>Steno bredanensis</i> (Lesson, 1828)	Least Concern	Data Deficient
19.	Risso's dolphin	<i>Grampus griseus</i> (Cuvier, 1812)	Least Concern	Least Concern
20.	Bottlenose dolphin	<i>Tursiops aduncus</i> (Ehrenberg, 1833)	Data Deficient	Least Concern
21.	Pan tropical spotted dolphin	<i>Stenella attenuate</i> (Gray, 1846)	Least Concern	Data Deficient
22.	Spinner dolphin	<i>Stenella longirostris</i> (Gray, 1828)	Data Deficient	Least Concern
23.	Striped dolphin	<i>Stenella coeruleoalba</i> (Meyen, 1833)	Least Concern	Data Deficient
24.	Long beaked common dolphin	<i>Delphinus capensis</i> Gray, 1828	Data Deficient	Least Concern
25.	Finless porpoise	<i>Neophocaena phocaenoides</i> (Cuvier, 1829)	Vulnerable	Near Threatened
26.	South Asian River dolphin	<i>Platanista gangetica</i> (Roxburgh, 1801)	Endangered	Endangered
27.	Sea cow	<i>Dugong dugon</i> (Müller, 1776)	Vulnerable	Endangered

* Status assigned based on sighting surveys conducted by the CMFRI during the years 2003 - 2012 under the project "Studies on marine mammals of Indian EEZ and the contiguous seas" funded by CMLRE, Ministry of Earth Sciences, Government of India

4.4. Produce appropriate material for creating and/or enhancing awareness in India about the role of marine mammals in marine ecosystems.

To create awareness and capacity building on “Marine mammals” the training programs were organized, lectures were organized and poster prepared.

4.4.1. Training

1. Trained the scientists and technical staff of Fisheries Environment Management Division on Cetacean identification during August 2015.
2. Training on rescue operations for students of CMFRI and Tamil Nadu
3. Interactive meeting with Fishers of Kerala and Tamil Nadu and showing them presentations on Marine mammals and their importance, rescue operations etc.

4.4.2. Lectures

1. Lecture on “Marine mammals of India and contiguous seas” in the National Workshop on “Cetacean Monitoring and Research Methods” held at Mumbai & Malvan from 25th February – 3rd March, 2016, organized by the Chief Conservator of Forests, Mangrove Cell & Nodal Officer, UNDP Sindhudurg Project, Maharashtra.
2. Lecture on “Dugong Rescue and Rehabilitation” in the workshop on “Dugong Conservation” to the Officials of various line departments like fisheries, forest, police, coast guard and navy held at Ramanathapuram, Tamil Nadu on 22nd March, 2016 organized by Wildlife wing of Dept. of Environment & Forests, Tamil Nadu.

4.4.3. Poster

Poster on how to handle and rescue cetaceans which are live and stranded was prepared.

4.4.4. Map

The map shows that in case of baleen whales, there were more occurrences of stranding along the west coast (60 numbers) and fewer occurrences along the east coast (26 numbers).

The interactive web map developed could be hosted in the web and on hovering the mouse over the stranding locations, a window will pop-up and give the details of the species stranded including the common name, scientific name, stranding location, state, year of stranding the reference (Plate 1 and 2). The web page also contains the identification keys of the marine mammal (Plate 3). These maps and web page can go a long way in sensitizing the public about the general locations of stranding and could help in the correct identification of the marine mammal.

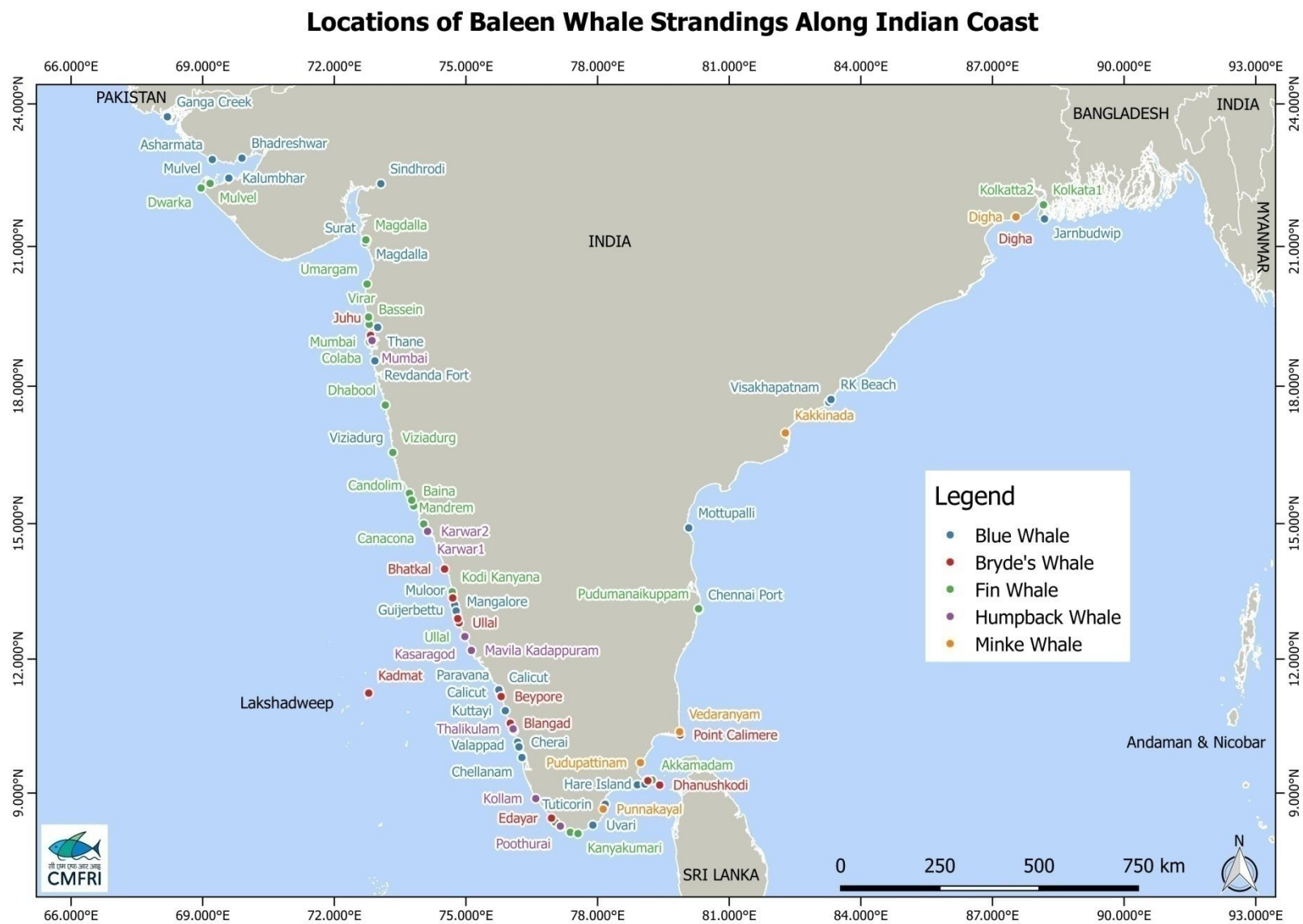


Fig. 25. Map 1. Locations of baleen whale strandings along Indian coast

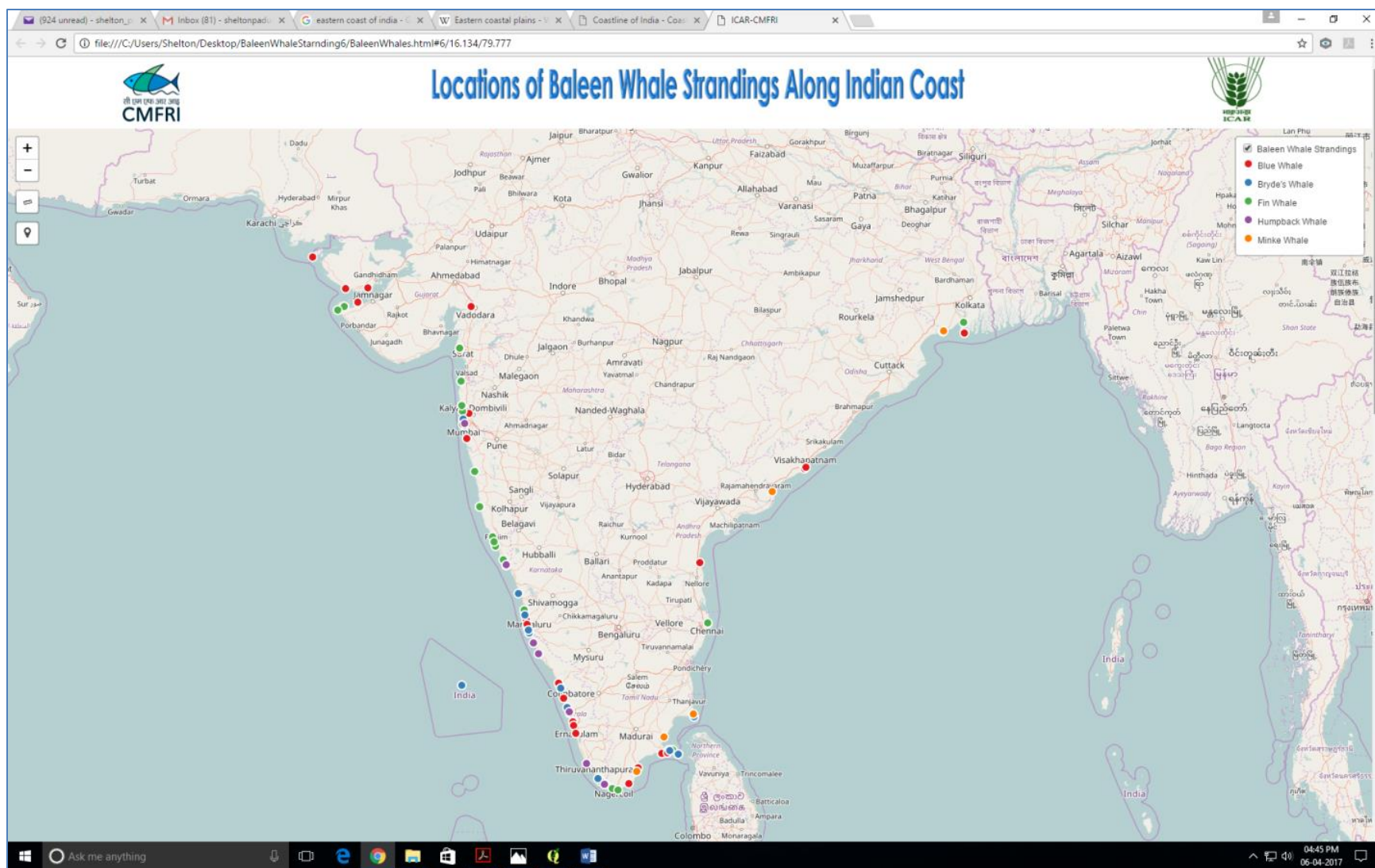


Fig. 26. Plate 1. Screen shot of the interactive web map created showing the legend (upper right corner) and the navigation pane (upper left corner)

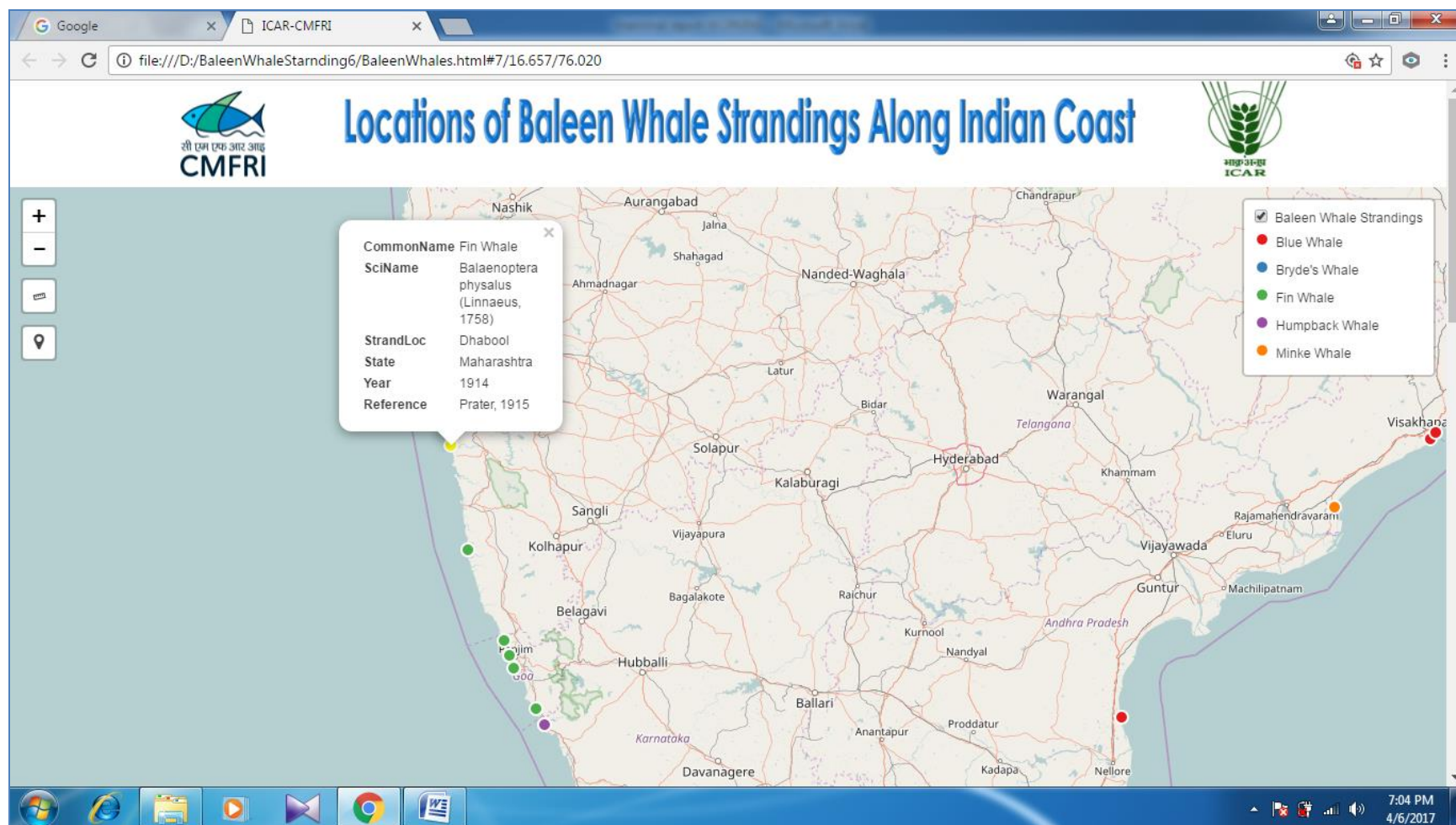



Fig. 27. Plate 2. Screen shot of the interactive web map showing pop-up window containing information of the species stranded at that location

Google x ICAR-CMFRI x

file:///D:/BaleenWhaleStarding6/BaleenWhales.html#5/16.130/79.783

Kuala Lumpur
Leaflet | qgis2web, © OpenStreetMap contributors, CC-BY-SA


Blue whale *Balaenoptera musculus* (Linnaeus, 1758)



Body shape	- slender and streamlined
Head	- broad, U-shaped from above and flat from side
Rostrum	- single prominent ridge along center which ends in splash guard around blow hole
Flippers	- long pointed
Dorsal fin	- relatively small, variably shaped, placed about 3/4 th of way back from rostrum tip
Flukes	- broad, tapered, smooth trailing edge prominent median notch
Body colour	- bluish grey dorsally, lighter underneath; head uniformly blue, Back and sides - mottled blue and light grey
Baleen plates	- 260 -400 pairs, black, broad based <1m long
Maximum size	- adult 24m, new-born 7-8m
Maximum weight	- 180 t

ICAR-CMFRI CMPA-GIZ


Fin whale *Balaenoptera physalus* (Linnaeus, 1758)



Body Shape	- sleek and streamlined
Rostrum	- single medial ridge on upper surface
Flippers	- long, tapered
Dorsal fin	- tall, falcate and set farther forward on the tail stock than in blue whale, rises at a shallow angle from the animal's back
Flukes	- Prominent ridge along tail stock between dorsal fin and flukes
Body colour	- black/dark brownish grey above and sides shading to white below; head colour asymmetrical; left lower jaw mostly dark and right jaw largely white; several light grey V - shaped chevrons on the back behind the head; light coloured streaks or swirls extending up from belly; flukes - white below and grey border
Throat grooves	- 50 -100 reaching to umbilicus
Baleen plate	- 260 -480 pairs, dark grey to black
Maximum size	- adult 22m new-born 6- 6.5m
Maximum weight	- 120 t

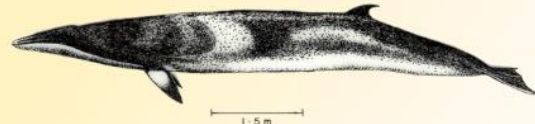
ICAR-CMFRI CMPA-GIZ

Bryde's whale *Balaenoptera edeni* Anderson, 1879



Body shape	- streamlined and sleek
Head	- somewhat pointed from above, makes up 25% of body length
Rostrum	- prominent ridge

Minke whale *Balaenoptera acutorostrata* Lacepede, 1804



Body shape	- sleek
Head	- sharply pointed and V-shaped
Rostrum	- prominent ridge

6:53 PM
4/6/2017

Fig. 28. Plate 3. Screen shot of the interactive web map displaying the species identification keys



CENTRAL MARINE FISHERIES RESEARCH INSTITUTE



WHY PROTECT MAMMALS ?

- Major consumers of production
- Play an important role in maintaining ecosystem health & fisheries

WHY STRANDINGS ARE SO IMPORTANT?

- Stranding : any creature having been left in a helpless position, that falters ashore ill, weak or lost.
- Mass stranded : 3 or more cetaceans
- Existence of some marine mammals species is known only from strandings.

THINGS TO BE REMEMBERED WHEN YOU SIGHT A STRANDED MAMMAL

- Safety of personnel is paramount
- The guiding principles in rescue must be in the best interest of the welfare of the animal
- Minimize risk to public health and safety
- Support scientific investigation
- Advance public education

Marine Mammals Conservation Advisory

"Protect marine mammals for sustainable fisheries"

Jeyabhaskaran R, Lavanya Ratheesh, Seban John, P. Vysakhan and V. Kripa
Fishery Environment Management Division
Central Marine Fisheries Research Institute, Kochi

Stranding Protocol



1. Contact local authorities: Police, Coast guard, Wildlife & Forest marine mammal service and keep people away



2. Make sure animal is alive: watch blow hole, breathing/ movement., note the animal's condition



3. Provide emergency care: protect from wind & sun, (shade), monitor respiration every 15 min



4. Keep the animal cool, splash water over its skin, apply wet towels. do not let water enter the blow hole



5. Support animal in upright position, depending on the size



6. Examination - Identifying the problem - sick, injured, confused etc, and treatment.



7. Releasing animal: consider minimal hazards to animal /people, decision by marine expert only



8. Do not drag or push the animal back to water, use proper means of transport and equipments



9. Carcass disposal: Burying - The hole should be deep enough and above the highest tide line. Skeleton can be retrieved after a few months. Burning - The quickest and most effective way, but it renders the skeleton useless for display.



EXAMINATION/TREATMENT

- Take photographs
- Conduct external examination, collect morphometrics,
- Respiration, heart rate, frothy mouth/blow hole, mucous membrane, blood analysis
- Equipments: heavy machinery, rescue/first aid, safety vests etc.



Mass stranding of short-finned pilot whale *Globicephala macrorhynchus*

REFERENCE

- NOAA
- www.whalefacts.com
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Fig. 24. Poster on Marine Mammal Conservation Advisory – Stranding Protocol

5. Conclusion and Recommendations

The study has provided information on the stranding of marine mammals, their entanglement in fishing gears, fishermen's opinion on these resources and the level of awareness on cetaceans in the Indian Seas. Based on these, the following recommendations are made:

1. The alarmingly high rate (7.2 per year) of stranding in the present decade is a matter of concern and the reasons for stranding have to be identified and solutions, if possible should be made.
2. The southwest and southeast coast of India is important cetacean habitats; hence any human development activity should consider that it does not affect the marine mammals.
3. Interaction with fishermen, villagers and forest officials indicated that the awareness level on significance of marine mammals is very low. Hence different audio-visual programs, including small documentary should be prepared. Frequent telecast of such programs is also essential to conserve these resources and their habitats.
4. The fishermen are of the opinion that the dugong population has drastically reduced in GoM and PB. Survey conducted also indicates the same. Seagrass habitat degradation is one of the reasons and concerted efforts should be made to assess the population and prevent further degradation of habitat especially in Tamil Nadu due to anthropogenic activities.
5. Entanglement of dolphins and porpoises in gill net has to be reduced. Use of modern acoustics methods like "pings" should be tested. A targeted study on this should be undertaken along Kerala / Karnataka coast and its impact on other resources should also be evaluated.
6. Facilities for rescue operations for those cetaceans which are alive and unable to swim back in coastal areas are not available in the country. It is essential at selected places to develop these along Tamil Nadu where mass strandings occur and in Kerala where resident populations of dolphins are present near fishing villages which sometimes swim to estuaries and then are unable to swim back.

7. The fisheries regulatory instruments such as Code of Conduct for Responsible Fisheries and Ecosystem-based Fisheries Management, which have conservation of endangered animals enshrined in the articles, need to be put in place. Establishment of Marine Mammal Sanctuaries should be initiated where populations of dolphins and dugongs are abundant.
8. Except for stranding and sighting records, there are no detailed studies on cetaceans of Indian waters. It is essential to have international collaborations and develop the skill and facilities to scientifically assess the population changes and behaviour of dolphins, porpoises and dugongs especially in areas where there are resident local populations which frequently interfere in fishing operations.
9. New communication tools should be developed to report sighting, stranding and entanglements and an active network on cetaceans should be started in the country.
10. A National plan of Action to protect marine mammals should be in place to conserve cetaceans of the Indian waters. The availability of good food especially plankton, pelagic fishes, and squids is a major factor which would support these resources. Hence all efforts should be made to protect this vulnerable group from anthropogenic impacts.

Annexure 1– Marine Mammal Stranding Network- India- Coordinators

(Name of the coordinators who represent an Institute or organisation will change if they leave the post or place of post.)

Sl.No	Name/Designation	Position	Affiliation
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24	Asst. Director of Fisheries (West) Colachel, Kanyakumari Dt. 632 251	Coordinator	DoF
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8	Shri. K. Raman Kumar FDO West Godavari District	Coordinator	DoF
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2	Deputy Conservator of Forests (Wild life) For South Andaman Districts	Coordinator	DoF
3	Divisional Forest Officer (Wild life), Mayabunder For north and middle Andaman District	Coordinator	DoF
4	Divisional Forest Officer (Nicobar Division) For Nicobar District	Coordinator	DoF
5	Scientist, ZSI, Port Blair	Coordinator	ZSI
6	Scientist, CARI, Port Blair	Coordinator	CARI

Annexure 2. Indian Marine Mammal Stranding Data

1. Blue whale *Balaenoptera musculus* (Linnaeus, 1758)

No.	Period	Details	Reference
1.	1874	Mangalore (Skeleton in Madras Museum)	Moses, 1947
2.	1890	Bay of Bengal & Malabar coast	Blanford, 1891
3.	1901	Reported as <i>Balaenoptera indica</i>	Pillay, 1926
4.	11.04.1906	Thane, Bombay, Maharashtra	Millard, 1907
5.	Aug 1912	Viziadurg near Ratnagiri (Reported as <i>Balaenoptera indica</i>)	Prater, 1915
6.	Nov 1927	Cherai, Cochin (Skeleton in St. Aloysius college, Mangalore)	Moses, 1947
7.	Feb 1934	Jarnbudwip, West Bengal	Jones, 1953
8.	March 1939	Mulvel, Okhamandel, Gujarat	Moses, 1947
9.	1.12.1960	Ganeshgram, Gujarat	
10.	23.02.1963	Magdalla Port, Surat, Gujarat	Daniel, 1963
11.	21.04.1964	Muloor, South Kanara	Nagabhushanam & Dhulkhed, 1964
12.	5.02.1966	Palk Bay, Mandapam, Tamilnadu	James & Soundararajan, 1979
13.	25.05.1966	Calicut, Kerala	Venkataraman & Girjavallabhan, 1966
14.	2.04.1969	Tuticorin, Tamilnadu	Bensam <i>et al.</i> , 1972
15.	20.12.1976	Uvari, Trichendur, Tamilnadu	Marichamy <i>et al.</i> , 1984
16.	Feb 1977	Bhadreshwar coast, Gujarat	Tiwari & Varu, 2001
17.	April 1983	Asharmata, Gujarat	Tiwari & Varu, 2001
18.	11.09.1983	Erayumanthurai, Tamil Nadu	Venkataramanujam <i>et al.</i> , 1984
19.	March 1984	Sindhrodi, Gujarat	Tiwari & Varu, 2001
20.	2.09.1985	Narakkal, Kochi	Nair & Jayaprakash, 1987
21.	Aug 1988	Kalumbhar Island, Gujarat	Tiwari & Varu, 2001
22.	29.09.1988	Paravana, near Calicut, Kerala	Lal Mohan, 1992
23.	10.12.1988	Mottupalli, Andhra	Rao & Rao, 1989
24.	2.05.1993	Chellanam, Cochin	James <i>et al.</i> , 1994
25.	9.05.1994	Visakhapatnam, Andhra	Mohanraj <i>et al.</i> , 1994
26.	25.11.1994	Dhanuskodi, Rameshwaram, TN	Lipton <i>et al.</i> , 1995
27.	29.10.1995	Valappad beach, Thrissur, Kerala	Baby, 1996
28.	July 1997	Ganga creek, Gujarat	Tiwari & Varu, 2001
29.	21.12.2001	Guijerbettu, Udupi, Karnataka	Anoop <i>et al.</i> , 2004

30.	Oct 2003-Feb 2007	Indian EEZ & Contiguous seas. (13 Nos sighted in 4 observations).	Afsal <i>et al.</i> , 2008
31.	17.07.2006	Kundugal, Mandapam, Tamilnadu	Afsal and Rajagopalan, 2007
32.	27.02.2010	Kuttayi, Malappuram, Kerala	Rajool Shanis <i>et al.</i> , 2011
33.	23.11.2010	Chennai Port, Chennai, Tamilnadu	The Hindu (News Paper) dated 24.11.2010
34.	13.09.2013	Sasihitlu Beach, Karnataka. 1 stranded. ID doubtful	Bindhu <i>et al.</i> , 2013 (MFIS, 217)
35.	14.04.2014	RK Beach, Visakhapatnam	Loveson <i>et al.</i> , 2014
36.	3.01.2015	Valai Island. Gulf of Mannar. 1 stranded.	CMFRI Newsletter, 143
37.	24.04.2015	Mandapam, Tamilnadu. 1 stranded	Nazar <i>et al.</i> , 2015
38.	24.06.2015	Revdanda fort, Raigad, Maharashtra. 1 stranded	Singh <i>et al.</i> , 2015
39.	7.07.2016	Hare Island, Thoothukudi, Gulf of Mannar. 1 stranded	The Hindu dated 8.07.16

2. Fin Whale *Balaenoptera physalus* (Linnaeus, 1758)

No.	Period	Details	Reference
1.	1879	5 Vertebrae at Medical College, Kolkata under the name <i>Balaenoptera blythi</i>	Anderson, 1879
2.	1901	Rajakamangalam, Kanyakumari, Tamilnadu. Identified as <i>Balaenoptera indica</i>	Pillay, 1926
3.	11.04.1906	Bassein, Mumbai. Identified as <i>Balaenoptera indica</i>	Millard, 1906
4.	9.01.1911	Viziadurg, Ratnagiri, Maharashtra. Identified as <i>B. indica</i>	Kinnear, 1911
5.	11.12.1914	Dhabool, Ratnagiri. Identified as <i>Balaenoptera indica</i> by Prater, 1915. Corrected by De Silva, 1987 as <i>B. physalus</i>	Prater, 1915 De Silva, 1987
6.	7.05.1934	Colaba, Mumbai	McCann, 1934
7.	4.02.1937	Pulluvila, Trivandrum, Kerala. Identified as <i>B. indica</i>	Poduval, 1937
8.	21.03.1939	Mulvel, Okhamandal. Identified as <i>B. indica</i>	Moses, 1940
9.	14.05.1951	Umargam, Mumbai. Reported by Chari, 1951. Confirmed by Daniel, 1963	Daniel, 1963
10.	6.08.1965	Virar near Mumbai	Grubh & Pereira, 1965
11.	9.10.1965	Coast of Nepean Sea Road, Mumbai	Karbhari <i>et al.</i> , 1966
12.	Dec. 1968	Mandrem, Goa	Dhawan, 1970
13.	26.02.1969	Off Baina, Goa	Dhawan, 1972
14.	Jan. 1970	Canacona, Goa	Dhawan, 1970
15.	3.04.1970	Candolim beach, Goa	Dhawan, 1970
16.	13.08.1971	off Magdalla near Surat, Gujarat	Karbhari, 1973
17.	22.01.1983	Akkamadam, Rameswaram Island, Tamilnadu	Nammalwar <i>et al.</i> , 1983

18.	-	Calcutta, West Bengal	De Silva, 1987
19.	15.06.1988	Pudumanaikuppam, Chennai, Tamilnadu	Subramani, 1989
20.	16.03.1989	Ullal, South Kanara, Karnataka	Kulkarni <i>et al.</i> , 1989
21.	14.04.1991	Kodi Kanyana (Kota), Karnataka	Purandhara & Vaman Naik, 1992
22.	20.11.1995	Kanyakumari	Joel <i>et al.</i> , 1996
23.	24.05.1996	Dwaraka, Gujarat. Identified as <i>B. indica</i>	Jani, 2002

3. Bryde's Whale *Balaenoptera edeni* Anderson, 1879

No.	Period	Details	Reference
1.	June 1871	Sittang Estuary (Burma), Bay of Bengal	Anderson, 1878
2.	2.7.1979	Beyppore, Calicut, Kerala	Lal Mohan, 1992
3.	14.4.1982	Seven seen on a cruise from Madras to Trincomalee	Leatherwood, 1992
4.	20.2.1983	Dhanushkodi, Tamilnadu	Lal Mohan, 1992
5.	April-May, 1988	Sighted at Andaman Sea	Dhandapani, 1998
6.	14.11.2000	Point Calimere	Kumaran, 2002
7.	8.8.2006	Mandapam, Tamilnadu	Jayasankar <i>et al.</i> , 2007
8.	27. 2009	Edayar, Thiruvananthapuram, Kerala	George <i>et al.</i> , 2011
9.	1.11.2010	Kadmat Island, Lakshadweep	Jafer Hisham (Pers com)
10.	12.12.2012	Digha, West Bengal 1 stranded	CMFRI
11.	2.05.2014	Blangad, Thrissur, Kerala. 1 stranded	Baby, 2015
12.	23.7.2015	Ullal beach, Karnataka. 1 stranded	CMFRI Newsletter, 146
13.	30.7.2015	Thannerbhavi Beach, Karnataka. 1 stranded	CMFRI Newsletter, 146
14.	30.7.2015	Bhatkal Beach, Karnataka. 1 stranded	CMFRI Newsletter, 146
15.	6.8.2015	Malpe beach, Karnataka. 1 stranded	CMFRI Newsletter, 146
16.	29.01.2016	Juhu Beach, Mumbai. 1 stranded	Singh <i>et al.</i> , 2016

4. Minke whale *Balaenoptera acutorostrata* Lacépède, 1804

No.	Period	Details	Reference
1.	19.05.1937	West coast of Sri Lanka	Deraniyagala, 1948
2.	24.05.1961	Killed 2 fishermen of Punnakayal, Thoothukudi, Tamilnadu	Silas, 1964
3.	4.08.1985	Kakinada, Andhra Pradesh	Seshagiri Rao, 1991
4.	23.08.2000	Pudupattinam, Thondi, Tamilnadu	Kasinathan, 2002
5.	30.06.2012	Vedaranyam, Nagapattinam, TN1 stranded	CMFRI
6.	12.12.2012	Digha, West Bengal 1 stranded	CMFRI

5. Humpback whale *Megaptera novaeangliae* (Borowski, 1781)

No.	Period	Details	Reference
1.	23.01.1943	Kollam, Kerala	Mathew, 1948
2.	15.11.1966	Off Bombay, caught by the Russian vessel 'Sovetskaya Ukraina'	
3.	1973	Karwar, Karnataka (Specimen at Dept. of Marine Biology, Karnatak University).	Naik, 2009
4.	15.01.1988	Kasargod, Kerala	Lal Mohan, 1992
5.	20 .01.1988	Mavila Kadappuram, Nileswaram, Kerala	Muthiah <i>et al.</i> , 1988
6.	18.11.2001	Poothurai, Kanyakumari, Tamilnadu	Kumaran, 2002
7.	2005	Off Gujarat coast (3 Nos sighted).	Gujarat Coast Guards (http://wildlifetrustofindia.org)
8.	20.08.2006	Off Jakhau coast, Gujarat (1 No. sighted).	Gujarat Coast Guards (http://wildlifetrustofindia.org)
9.	18.05.2008	Thalikulam, Thrissur, Kerala	Baby, 2009
10.	17.09.2009	Karwar beach, Karnataka	Naik, 2009

6. Sperm Whale *Physeter macrocephalus* Linnaeus, 1758

No.	Period	Details	Reference
1.	Jan 1890	Madras (observed by Thurston)	Blanford, 1891
2.	25.02.1971	Kalpeni Island, Lakshadweep	James and Panicker, 1990
3.	23.06.1972	Karwar , Karnataka	Antony Raja and Pai, 1973
4.	July 1979	Manauli Island , Gulf of Mannar	James and Soundararajan, 1980
5.	12.04.1980	Mahabalipuram, Near Madras	James and Manivasagam, 1980
6.	30.04.1980	Krusadal Island, Gulf of Mannar	James and Manivasagam, 1980
7.	25.11.1980	Puthanthuruth Island, Kollam	Bande <i>et. al.</i> , 1980
8.	08.06.1982	Pudhupattinam, Tranquebar, Tamilnadu	Silas <i>et al.</i> , 1985
9.	1.11.1982	Cheriyen shore, Kalpeni, (Lakshadweep Islands)	James and Panicker, 1990
10.	11.12.1982	Pudupet, Tranquebar, Tamilnadu	Kuthalingam <i>et al.</i> , 1983
11.	22.12.1982	Chetlat Island , Lakshadweep	James and Panicker, 1990
12.	08.06.1982	Pudhupattinam, Tranquebar, Tamilnadu	Silas <i>et al.</i> , 1985
13.	19.04.1983	South India (3 specimens)	Leatherwood <i>et al.</i> , 1984
14.	15.12.1983	Peddaganjapallipalem, Andhra	Anonymous, 1983
15.	7.08.1984	Chetlat Island, Lakshadweep	James and Panicker, 1990
16.	20.01.1986	Manapad, Palk Bay, Tamilnadu	Venkataramanujam <i>et al.</i> , 1987

17.	5.11.1986	Hare Island, Gulf of Mannar	Sivadas <i>et al.</i> , 1989
18.	3.12.1986	Pommiyarpalayam, Pondicherry	Nammalwar <i>et al.</i> , 1989
19.	19.11.1986	Chetlat Island , Lakshadweep	James and Panicker, 1990
20.	18.12.1988	Saminathanpettai, Nagapattinam, Tamilnadu	Nammalwar <i>et al.</i> , 1992
21.	8.03.1988	Kasimedu, Madras	Nammalwar <i>et al.</i> , 1989
22.	1.02.1989	Neelankaraikuppam, Madras	Nammalwar <i>et al.</i> , 1989
23.	15.08.1990	Chetlat Island, Lakshadweep	James, 1994
24.	18.01.1991	Vizhuthamavadi	Nammalwar <i>et al.</i> , 1992
25.	July 1998	Jakhau coast, Gujarat	Tiwari and Varu., 2001
26.	10.11.2000	Manadapam, Gulf of Mannar	Kasinathan and Gandhi, 2002
27.	21.01.2002	Chennai, Tamilnadu	Nammalwar <i>et al.</i> , 2002
28.	Oct 2000-Feb 2007	Indian EEZ & Contiguous seas. (41 Nos observed in 9 sightings).	Afsal <i>et al.</i> , 2008
29.	18.12.2003	Parangipettai, Tamilnadu	Murugan and Ajmalkhan, 2003
30.	20.01.2006	Rameswaram, Tamilnadu	Afsal and Rajagopalan, 2006
31.	16.03.2006	5 Nos sighted off Chetlat, Lakshadweep	Pande <i>et al.</i> , 2009
32.	31.05.2006	Honnegadde, Karnataka	Ganesh, 2006
33.	17.09.2009	Devbagh beach, Karwar, Karnataka	Naik <i>et al.</i> , 2010
34.	12.12.2009	Muttam, Kanyakumari, Tamilnadu (1 No. stranded; 30 f length, 6 f width)	Dinakaran (Tamil News Paper; dated 20.12.2009
35.	4.08.2010	Puducherry Beach, Pondicherry	The Hindu (News Paper) dated 4.08.2010.
36.	14.09.2012	Talashil landing centre, Maharashtra. 1 stranded	Bashir, 2013 (MFIS No. 215).

7. Pygmy Sperm Whale *Kogia breviceps* (Blainville, 1838)

No.	Period	Details	Reference
1.	Feb 1925	Trivandrum coast, Kerala. 2 Nos (1 adult-10f & a calf)	Pillay, 1926
2.	May 1985-Dec 1988	Gulf of Mannar (West coast of Sri Lanka, 1 No. sighted).	Anouk Ilangakoon, 1997
3.	1987	Waltair coast, Andhra (1 female specimen reported)	James & Lal Mohan, 1987
4.	8.07.1988	Port Blair, Andaman. (2 Nos, 1 adult and a calf)	Chantrapornsyl <i>et al.</i> , 1991
5.	5.03.2010	Parangipettai, Tamilnadu.	Ravi & Murugan, 2010

8. Dwarf Sperm Whale *Kogia simus* Owen, 1866

No.	Period	Details	Reference
1.	28.02.1853	Visakhapatnam, Andhra (Skeleton of a female specimen gifted to British museum by Sir Walter Elliot & described as <i>Physeter (Euphysetes) simus</i>).	Flower, 1885; Blanford, 1891
2.	19.12.1952	Trivandrum, Kerala. (Skull gifted to British Museum of Natural History).	Hall & Kelson, 1959
3.	May 1985- Dec 1988	Gulf of Mannar (West coast of Sri Lanka, 5 Nos sighted).	Anouk Ilangakoon, 1997
4.	6.06.2006	Dumas coast, Surat, Gujarat	Dipani & Wildlife Trust of India, 2006

9. Killer Whale *Orcinus orca* (Linnaeus, 1758)

No.	Period	Details	Reference
1.	1872	Gulf of Mannar (Northwestern coast of Sri Lanka)	Holdsworth, 1872
2.	-	Nicobar Island (Skull kept in Bombay Natural History Museum)	Pilleri and Gehr, 1973-74
3.	March 1943	Aramda, Okhamandal, Gujarat (1 No, stranded)	Moses, 1948
4.	Jan 1971	Minicoy Island, Lakkashadweep. (6 Nos sighted by Morzer-Bruyns)	Leatherwood <i>et al.</i> , 1991
5.	6.12.1978	Bay of Bengal (13°20S, 83°20E). 2 Nos sighted	Leatherwood <i>et al.</i> , 1991
6.	12.04.1983	Northeast of Andaman Islands	Leatherwood <i>et al.</i> , 1984
7.	14.07.1983	Negombo, Sri Lanka	Ilangakoon <i>et al.</i> , 1992
8.	8.04.1986	Negombo, Sri Lanka	Ilangakoon <i>et al.</i> , 1992
9.	Marh 2008- Feb 2009	Northern Indian Ocean around Sri Lanka (3 Nos sighted).	Ilangakoon <i>et al.</i> , 2011
10.	19.12.2012	Vasco, Goa, 3 sighted	CMFRI

10. False Killer Whale *Pseudorca crassidens* (Owen, 1846)

No.	Period	Details	Reference
1.	14.02.1901	Trivandrum, Kerala	Ferguson, 1903
2.	Feb 1902	Trivandrum, Kerala	Poduval, 1937
3.	18.10.1975	Rameswaram, Tamilnadu	Thiagarajan <i>et al.</i> , 1984
4.	-	Trivandrum, Kerala	Dawson, 1911
5.	-	Trivandrum, Kerala (Skeleton in Trivandrum Museum)	Pillay, 1926
6.	1907	Rajakamangalam, Tamilnadu (Skeleton in	Pillay, 1926

		Trivandrum Museum)	
7.	27.11.1960	Pozikkara, Colachel, Tamilnadu. (2 Nos stranded)	Silas & Kumara Pillay, 1961
8.	27.11.1960	Uvari, Tamilnadu	Silas & Kumara Pillay, 1961
9.	-	Alleppy, Kerala	Silas & Kumara Pillay, 1961
10.	28.07.1975	Puthippa, Calicut, Kerala	Lai Mohan <i>et al.</i> , 1984
11.	18.10.1975	Rameswaram, Tamilnadu	Thiagarajan <i>et al.</i> , 1984
12.	27.7.1976	Port Blair, Andaman. (2 Nos entangled in gill net)	James , 1984; Sivaprakasam, 1980
13.	9.06.1977	Port Blair, Andaman.	Sivaprakasam, 1980
14.	1981-1984	Northern Indian Ocean & Sri Lanka. (43 Nos sighted at 6 observations).	Alling, 1986
15.	7.03.1983	Campbell Bay, Shastri Nagar, Great Nicobar	James, 1985
16.	4.04.1988	Palk Bay, Mandapam, Tamilnadu	CMFRI, 1988
17.	5.07.1988	Off Mandapam, Tamilnadu	Vedavyasa Rao, 1989
18.	6.08.1992	Off Veerapandianpatnam, Thiruchendur, Tamilnadu	Kasim <i>et al.</i> , 1993
19.	17.07.2001	Ennore, Chennai, Tamilnadu (Incidentally caught in gill net)	Nammalwar <i>et al.</i> , 2002
20.	Oct 2003-Feb 2007	Indian EEZ & Contiguous seas. (22 Nos observed in 4 sightings)	Afsal <i>et al.</i> , 2008

11. Pygmy killer whale *Feresa attenuata* Gray, 1874

No.	Period	Details	Reference
1.	14.12.2009	Munambam Fishing Harbour, Kochi. 2 stranded	Jeyabaskaran <i>et al.</i> , 2011

12. Melon-headed Whale *Peponocephala electra* (Gray, 1846)

No.	Period	Details	Reference
1.	23.08.1853	Madras, Tamilnadu. (Skull kept in British Museum of Natural History and described as <i>Delphinus (Lagenorhynchus) fusiformis</i>)	Owen, 1866
2.	-	Skull from Palk strait, kept in Calcutta Museum	Blanford, 1891
3.	1947	Visakhapatnam, Andhra. (Sighted by Bierman and Slijper)	Leatherwood <i>et al.</i> , 1991
3.	Before 1971	Car Nicobar Island (Specimen collected by Mörzer Bruyns)	Leatherwood <i>et al.</i> , 1991
4.	27.01.1998	Parangipettai, Tamilnadu. (Specimen	Karuppiiah <i>et al.</i> , 1998

		kept in CAS in Marine Biology Museum, Annamalai University)	

13. Short-finned Pilot Whale *Globicephala macrorhynchus* Gray, 1846

No.	Period	Details	Reference
1.	July 1852	Hooghly River, near Scramapore, Calcutta, West Bengal. (Many dozens stranded)	Jerdon, 1867; Moses, 1947; De Silva, 1987
2.	26.01.1923	10 miles north of Bombay, Maharashtra (3 photos in The British Museum of Natural History)	Leatherwood <i>et al.</i> , 1991
3.	1950	Salt Lake, Calcutta, West Bengal. (Dozens stranded)	Jones, 1953; De Silva, 1987
4.	14.01.1973	Kulasekharapattinam to Manapad, Tamilnadu. (Mass stranding of 147 Nos)	Alagaraswami <i>et al.</i> , 1973
5.	14.12.1980	Malabar Coast. (2 pods observed by Harwood)	Leatherwood <i>et al.</i> , 1991
6.	16.12.1980	Malabar Coast. (5 Nos observed by Harwood)	Leatherwood <i>et al.</i> , 1991
7.	1981-1984	Northern Indian Ocean and Sri Lanka. (78 Nos sighted at 3 observations)	Alling, 1986
8.	29.07.1986	Pudukuppam, Cuddalore, Tamilnadu (2 Nos incidentally caught in gill net).	Nammalwar <i>et al.</i> , 1989
9.	Oct 2003-Sep 2007	Indian EEZ & Contiguous Seas. (19 Nos sighted in 3 observations)	Afsal <i>et al.</i> , 2008
10.	21.10.2012	Elizabeth Bay, Diglipur, North Andaman. 40 stranded	Raghunathan <i>et al.</i> , 2012
11.	11-15 th Jan, 2016	Manapad, Trichendur, GOM Tamilnadu. 81 stranded	Jeyabaskaran, 2016

14. Indo-Pacific Beaked Whale *Indopacetus pacificus* (Longman, 1926)

No.	Period	Details	Reference
1.	28.01.2009	Southern Bay of Bengal. 5 sighted	Afsal <i>et al.</i> , 2009

15. Cuvier's Beaked Whale *Ziphius cavirostris* G. Cuvier, 1823

No.	Period	Details	Reference
1.	July 1940	Gulf of Mannar, West coast of Sri Lanka. (1	Baptist, 1941

		No. stranded alive in the shore)	
2.	10.11.1982	Minicoy Island, Lakshadweep. (1 No. stranded on reef flat).	Pillai <i>et al.</i> , 1981
3.	3.12.1982	Gulf of Mannar, Sri Lanka. (2 Nos sighted in single observation)	Alling, 1986
4.	15.03.1983	Trincomalee, Bay Of Bengal (Sri Lanka, 1 calf caught by harpoon fishing)	Alling, 1988
5.	26.04.1989	Parangipettai, Tamilnadu	Karuppiah <i>et al.</i> , 1998; Kumaran & Subramanian, 1993
6.	15.02.2013	Ankola, Karnataka 1 stranded	CMFRI

16. Rough-toothed Dolphin *Steno bredanensis* (Lesson, 1828)

No.	Period	Details	Reference
1.	1889	Nicobar Islands & Bay of Bengal (Reported as <i>Steno frontatus</i>).	Blanford, 1891
2.	Mar 1982-Dec 1984	Bay of Bengal, off Sri Lanka (3 Nos incidentally caught in drift net).	Alling, 1988
3.	1985-1989	Northern Indian Ocean & Sri Lanka (5 Nos entangled in gill net)	Anouk Ilangakoon <i>et al.</i> , 1992.
4.	25.08.2008	Beleekeri, Karwar, Karnataka (1 No. stranded).	CMFRI, 2008

17. Risso's Dolphin *Grampus griseus* (G. Cuvier, 1812)

No.	Period	Details	Reference
1.	1981-1984	Northern Indian Ocean & Sri Lanka (321 Nos recorded in 37 observations)	Alling, 1986
2.	1983-1986	Indian Ocean & Sri Lanka (241 Nos incidentally caught in drift gillnet at Sri Lanka. 36 Nos sighted with group size of 17 Nos)	Kruse <i>et al.</i> , 1991
3.	25.02.1986	Off Trplicane, Chennai (1 No died because of hit by vessel)	Rajagopalan <i>et al.</i> , 1986
4.	31.08.1998	Vizhinjam, Kerala (entangled in shoreseine)	Thiagarajan <i>et al.</i> , 1999
5.	26.06.1999	Punnaikkayal, Tuticorin, Tamilnadu	Balasubramanian & Easterson, 2000
6.	30.06.1999	Beemapally, Vizhinjam, Kerala (3 Nos stranded)	Thiagarajan & Krishna Pillai, 2000
7.	1.12.1999	Tuticorin Fisheries Harbour, Tamilnadu	Balasubramanian & Easterson, 2000
8.	Oct 2003-Sep 2007	Indian EEZ & Contiguous Seas (72 Nos sighted in 4 observations)	Afsal <i>et al.</i> , 2008
9.	Sep 2004	Chennai, Tamilnadu (1 No. incidentally caught in	Anoop <i>et al.</i> , 2008

		gill net)	
10.	Oct 2004	Chennai, Tamilnadu (1 No. incidentally caught in gill net)	Anoop <i>et al.</i> , 2008
11.	9.02.2005	Chennai, Tamilnadu (Incidentally caught in gill net)	Rajapackiam <i>et al.</i> , 2008
12.	26.02.2012	Basant Nagar, Chennai, Tamilnadu	Dinamalar (Tamil News Paper) dated 27.02.2012
13.	23.08.2013	Aligadda Beach, Karwar, Karnataka. 1 stranded	Praveen <i>et al.</i> , 2014 (MFIS, 221).

18. Spinner Dolphin *Stenella longirostris* (Gray, 1828)

No.	Period	Details	Reference
1.	1976	Off Calicut coast, Kerala (28 Nos caught in gill net)	Lal Mohan, 1985
2.	1977	Off Calicut coast, Kerala (38 Nos caught in gill net)	Lal Mohan, 1985
3.	1978	Off Calicut coast, Kerala (10 Nos caught in gill net)	Lal Mohan, 1985
4.	1979	Off Calicut coast, Kerala (5 Nos caught in gill net)	Lal Mohan, 1985
5.	1980	Off Calicut coast, Kerala (11 Nos caught in gill net)	Lal Mohan, 1985
6.	1981-1984	Northern Indian Ocean & Sri Lanka (1,804 Nos sighted at 48 observation).	Alling, 1986
7.	1982	Parangipettai, Tamilnadu	Shantha <i>et al.</i> , 1987
8.	Between 15.03.1982 to 1.09.1987	Parangipettai, Tamilnadu (5 Nos incidentally caught)	Rajaguru & Shantha, 1992
9.	July 1983	Cochin, Kerala (23 Nos Incidentally caught in gill net)	Jayaprakash <i>et al.</i> , 1995
10.	Aug 1983	Cochin, Kerala (17 Nos Incidentally caught in gill net)	Jayaprakash <i>et al.</i> , 1995
11.	Sep 1983	Cochin, Kerala (12 Nos Incidentally caught in gill net)	Jayaprakash <i>et al.</i> , 1995
12.	March 1984	Cochin, Kerala (1 No. Incidentally caught in gill net)	Jayaprakash <i>et al.</i> , 1995
13.	April 1984	Cochin, Kerala (3 Nos. Incidentally caught in gill net)	Jayaprakash <i>et al.</i> , 1995
14.	May 1984	Cochin, Kerala (12 Nos. Incidentally caught in gill net)	Jayaprakash <i>et al.</i> , 1995
15.	Sep 1984	Cochin, Kerala (27 Nos. Incidentally caught in gill net)	Jayaprakash <i>et al.</i> , 1995
16.	Sep 1985	Cochin, Kerala (10 Nos. Incidentally caught in gill net)	Jayaprakash <i>et al.</i> , 1995
17.	Oct 1985	Cochin, Kerala (13 Nos. Incidentally	Jayaprakash <i>et al.</i> , 1995

		caught in gill net)	
18.	Nov 1985	Cochin, Kerala (2 Nos. Incidentally caught in gill net)	Jayaprakash <i>et al.</i> , 1995
19.	11.02.1986	Janjira-Murud, Maharashtra (2 Nos stranded)	Karbhari <i>et al.</i> , 1985
20.	May 1986	Cochin, Kerala (17 Nos. Incidentally caught in gill net)	Jayaprakash <i>et al.</i> , 1995
21.	Aug 1986	Cochin, Kerala (9 Nos. Incidentally caught in gill net)	Jayaprakash <i>et al.</i> , 1995
22.	Sep 1986	Cochin, Kerala (1 No. Incidentally caught in gill net)	Jayaprakash <i>et al.</i> , 1995
23.	Oct 1986	Cochin, Kerala (4 Nos. Incidentally caught in gill net)	Jayaprakash <i>et al.</i> , 1995
24.	Dec 1986	Cochin, Kerala (4 Nos. Incidentally caught in gill net)	Jayaprakash <i>et al.</i> , 1995
25.	21.02.1987	Off Quilon, Kerala (120 Nos sighted)	Lal Mohan, 1990
26.	1989	Parangipettai, Tamilnadu (18 Nos collected)	Kumaran, 2003
27.	29.03.1989	Veraval, Gujarat	CMFRI, 1989
28.	29.09.1989	Mandapam, Tamilnadu	Krishna Pillai <i>et al.</i> , 1989
29.	28.12.1990	South Managalore, Karnataka (300 Nos sighted)	Jayaprakash <i>et al.</i> , 1995
30.	21.08.1991	Visakhapatnam, Andhra	Seshagiri Rao & Narayana Rao, 1992
31.	19.04.1993	Visakhapatnam, Andhra (3 Nos stranded)	Satya Rao & Chandrashekar, 1994
32.	17.12.1995	Kovalam, Vizhinjam, Kerala	Krishna Pillai, 2002
33.	28.06.1999	Vellapatty, Tuticorin, Tamilnadu (9 Nos stranded)	Balasubramanian <i>et al.</i> , 2000
34.	21.09.1999	Tharuvaikulam, Tuticorin, Tamilnadu	Balasubramanian & Jesi Selvarani, 2001
35.	30.09.1999	Tuticorin, Tamilnadu	Balasubramanian & Jesi Selvarani, 2001
36.	Oct 2003-Feb 2007	Indian EEZ & Contiguous seas. (552 Nos sighted in 17 observations)	Afasl <i>et al.</i> , 2008
37.	8.04.2004	Managalore, Karnataka (5 Nos stranded)	Anoop <i>et al.</i> , 2004
38.	10.4.2004	Mangalore, Karnataka (10 Nos stranded)	Anoop <i>et al.</i> , 2004
39.	19.07.2004	Mandapam, Tamilnadu	Kasinathan and Kannan, 2005
40.	13.09.2004	Dhanushkodi, Rameswaram, Tamilnadu	Kasinathan <i>et al.</i> , 2005
41.	Sep 2004	Mangalore, Karnataka (1 No.)	
42.	20.04.2005	Chennai, Tamilnadu	Rajapackiam <i>et al.</i> , 2005
43.	Sep-Oct 2004	Chennai & Kakinada (16 Nos incidentally caught in fishing gear)	Yousuf <i>et al.</i> , 2010
44.	12 th -16 th	Mangalore-Lakshadweep (58 Nos	Pande <i>et al.</i> , 2009

	March 2006	sighted)	
45.	25.04.2009	Thalikulam, Thrissur, Kerala	Baby, 2010
46.	29.07.2010	Blangad, Thrissur, Kerala	Baby, 2011
47.	21.07.2012	Dummulapea landing centre, Andhrapradesh. 5 incidentally caught in gillnet	Prabhakaret <i>al.</i> , 2014 (MFIS, 220)
48.	16.11.2012	Bhandarpule, Ratnagiri, Maharashtra. 8 sighted	CMFRI
49.	12.12.2012	Puri, Odisha 1 stranded	CMFRI
50.	18.09.2013	Mangalore Fisheries Harbour, Karnataka. 1 incidentally caught in gillnet	Bindu et al., 2014 (MFIS, 222).
51.	23.12.2013	Kovalam, Chennai. 1 rescued and died	Kizhakudanet <i>al.</i> , 2014
52.	10.03.2015	Puthankadapuram, Thrissur, Kerala 1 stranded	Baby, 2015

19. Pantropical Spotted Dolphin *Stenella attenuata*(Gray, 1846)

No.	Period	Details	Reference
1.	1846	Bay of Bengal (described as <i>Steno 56ttenuate56</i>)	Gray, 1846
2.	1889	Bay of Bengal near Sundarban (described as <i>Delphinus malayanus</i>)	Blanford, 1891
3.	1981- 1984	Northern Indian Ocean & Sri Lanka (656 Nos sighted in 14 observations).	Alling, 1986
4.	13.04.1983	Northern Bay of Bengal	Leatherwood <i>et al.</i> , 1984
5.	Oct 2004	Chennai, Tamilnadu (1 No. incidentally caught in gillnet)	Yousuf <i>et al.</i> , 2008
6.	6.03.2009	Arabian sea, Karachi, Pakistan (Mass stranding of 250 Nos).	ShoaibKiani <i>et al.</i> , 2011
7.	10.03.2014	Kovalam Beach, Chennai. 1 stranded	Kizhakudanet <i>al.</i> , 2014

20. Striped Dolphin *Stenella coeruleoalba* (Meyen, 1833)

No.	Period	Details	Reference
1.	1981- 1984	Northern Indian Ocean & Sri Lanka (531Nos sighted in 12 observations).	Alling, 1986
2.	25.05.1989	Off Parangipettai, Tamilnadu (1 Male).	Kumaran, 2003
3.	Oct 2003- Sep 2007	Indian EEZ & Contiguous seas. (5 Nos sighted at off Kerala in single observation).	Afsal <i>et al.</i> , 2008

21. Long-beaked Common Dolphin *Delphinus capensis* (Gray, 1828)

No.	Period	Details	Reference
1.	1976	Calicut, Kerala. 2 Nos incidentally caught in gillnet. Identified as <i>Delphinus delphis tropicalis</i> .	Lal Mohan, 1985
2.	1977	Calicut, Kerala. 5 Nos incidentally caught in gillnet. Identified as <i>Delphinus delphis tropicalis</i> .	Lal Mohan, 1985
3.	1978	Calicut, Kerala. 1 No. incidentally caught in gillnet. Identified as <i>Delphinus delphis tropicalis</i> .	Lal Mohan, 1985
4.	30.03.1979	Port Blair, Andaman. 1 No. incidentally caught in longline gear.	Sivaprakasam, 1980
5.	1980	Calicut, Kerala. 6 Nos incidentally caught in gillnet. Identified as <i>Delphinus delphis tropicalis</i> .	Lal Mohan, 1985
6.	1981-1984	Northern Indian Ocean & East Coast of Sri Lanka (711 Nos of <i>D. delphis</i> sighted at 14 observations).	Alling, 1986
7.	1982-1987	Sakthikulangara, Quilon, Kerala. 145 Nos of <i>Delphinus delphis</i> entangled in drift net and landed.	Mahadevan Pillai & Chandrangathan, 1990
8.	8.12.1982	Krusadai Island, Manadapam, Tamilnadu. (Reported as <i>Delphinus delphis</i>).	Krishna Pillai and Kasinathan, 1987
9.	20.02.1982	CMFRI Jetty, Mandapam, Tamilnadu. (Reported as <i>D. delphis</i>)	Krishna Pillai and Kasinathan, 1987
10.	1983	Calangute beach, Goa. 10 Nos of <i>D. delphis</i> stranded	De Silva, 1987
11.	July 1983	Cochin, Kerala. (10 Nos incidentally caught in gill net. Identified as <i>D. delphis</i>)	Jayaprakash <i>et al.</i> , 1995
12.	Aug 1983	Cochin, Kerala. (7 Nos incidentally caught in gill net. Identified as <i>D. delphis</i>)	Jayaprakash <i>et al.</i> , 1995
13.	Sep 1983	Cochin, Kerala. (11 Nos incidentally caught in gill net. Identified as <i>D. delphis</i>)	Jayaprakash <i>et al.</i> , 1995
14.	Oct 1983	Cochin, Kerala. (3 Nos incidentally caught in gill net. Identified as <i>D. delphis</i>)	Jayaprakash <i>et al.</i> , 1995
15.	May 1984	Cochin, Kerala. (16 Nos incidentally caught in gill net. Identified as <i>D. delphis</i>)	Jayaprakash <i>et al.</i> , 1995
16.	July 1984	Cochin, Kerala. (1 No. incidentally caught in gill net. Identified as <i>D. delphis</i>)	Jayaprakash <i>et al.</i> , 1995
17.	Sep 1984	Cochin, Kerala. (5 Nos incidentally caught in gill net. Identified as <i>D. delphis</i>)	Jayaprakash <i>et al.</i> , 1995
18.	Oct 1984	Cochin, Kerala. (8 Nos incidentally caught in gill net. Identified as <i>D. delphis</i>)	Jayaprakash <i>et al.</i> , 1995
19.	May 1986	Cochin, Kerala. (15 Nos incidentally caught in gill net. Identified as <i>D. delphis</i>)	Jayaprakash <i>et al.</i> , 1995
20.	Sep 1986	Cochin, Kerala. (1 No. incidentally caught in gill net. Identified as <i>D. delphis</i>)	Jayaprakash <i>et al.</i> , 1995

21.	5.09.1987	Paradeep, Orissa. 12 Nos of <i>D. delphis</i> sighted during FORV <i>Sagar Sampada</i> (Cruise No. 58)	Jayaprakash <i>et al.</i> , 1995
22.	5.02.1989	Kakinada, Andhra. 8 Nos of <i>D. delphis</i> sighted during FORV <i>Sagar Sampada</i> (Cruise No. 58)	Jayaprakash <i>et al.</i> , 1995
23.	18.02.1991	Wadge Bank, Kerala. 4 Nos of <i>D. delphis</i> sighted during FORV <i>Sagar Sampada</i> (Cruise No. 85)	Jayaprakash <i>et al.</i> , 1995
24.	10.04.1991	Mandapam, Tamilnadu. (Reported as <i>D. delphis</i>)	Krishna Pillai & Lipton, 1996
25.	20.03.1997	Janjira- Murud, Maharashtra. (Reported as <i>D. delphis</i>)..	Jadhav & Rao, 1998
26.	14.10.1997	Balaramapuram, Andhra. (Reported as <i>D. delphis</i>).	Chandrakumar, 1998
27.	15.11.1997	Janjira- Murud, Maharashtra. (Reported as <i>D. delphis</i>)	Ramnesh Rao, 1998
28.	1997	Dummulapeta, Andhra. (Reported as <i>D. delphis</i>).	Thathayya & Achayya, 1998
29.	30.06.1999	Vellapatty, Tuticorin, Tamilnadu. 45 Nos of <i>D. delphis</i> stranded (mass mortality)	Jawahar <i>et al.</i> , 2000
30.	Feb 2000- March 2002	Jamnagar Coast, Gulf of Kachchh, Gujarat. 116 Nos sighted	Singh, 2003
31.	Oct 2001	Gulf of Kachchh Marine Park Area, Gujarat. 73 Nos sighted.	Singh, 2003
32.	Nov 2001	Gulf of Kachchh Marine Park Area, Gujarat. 96 Nos sighted.	Singh, 2003
33.	Dec 2001	Gulf of Kachchh Marine Park Area, Gujarat. 61 Nos sighted.	Singh, 2003
34.	2003-2007	Indian EEZ & Contiguous seas. 132 Nos sighted in 8 observations.	Afsal <i>et al.</i> , 2008

22. Indo-Pacific Bottlenose Dolphin *Tursiops aduncus* (Ehrenberg, 1832)

No.	Period	Details	Reference
1.	1846	Type of <i>Delphinus eurynome</i> from Bay of Bengal & 4 skeletons from Trivandrum kept in the British Museum of Natural History.	Leatherwood & Clarke, 1983
2.	1848	Stuffed type specimen of <i>Delphinus perniger</i> in Museum of Asiatic Society, Calcutta	Herskovitz, 1966
3.	1883	Visakhapatnam, Andhra (Reported as <i>Delphinus godamu</i> . Kept in the British Museum of Natural History)	Leatherwood, 1985
4.	Feb 1902	Trivandrum, Kerala (Identified as <i>Tursiops catalanta</i>)	Pillay, 1926
5.	March 1903	Trivandrum, Kerala (Reported as <i>Tursiops catalania</i>)	Lydekker, 1904
6.	15.10.1903	Vizhinjam, Kerala (Reported as <i>Tursiops</i>)	Lydekker, 1905

		<i>abusalam</i>)	
7.	1904	Trivandrum, Kerala (Reported as <i>Tursiops gilli</i>)	Pillay, 1926
8.	Feb 1908	Travancore (Kerala). (Identified as <i>Tursiops dawsoni</i> , kept in the British Museum of Natural History)	Pillay, 1926; De Silva, 1987
9.	18.02.1973	Mandovi Estuary, Goa	Pilleri and Gihir, 1973
10.	1976	Calicut, Kerala (5 Nos caught in gill net)	Lal Mohan, 1985
11.	1977	Calicut, Kerala (2Nos caught in gill net)	Lal Mohan, 1985
12.	1978	Calicut, Kerala (12 Nos caught in gill net)	Lal Mohan, 1985
13.	1979	Calicut, Kerala (4Nos caught in gill net)	Lal Mohan, 1985
14.	1980	Calicut, Kerala (34 Nos caught in gill net)	Lal Mohan, 1985
15.	12.11.1980	Krusadai Island, Gulf of Mannar, Tamilnadu	Krishna Pillai and Kasinathan, 1987
16.	1.12.1980	Calicut, Kerala	Lal Mohan, 1981
17.	31.01.1981	Calicut, Kerala	Lal Mohan, 1981
18.	26.11.1981	Krusadai Island, Gulf of Mannar, Tamilnadu	Krishna Pillai & Kasinathan, 1987
19.	8.12.1981	Krusadai Island, Gulf of Mannar, Tamilnadu	Krishna Pillai & Kasinathan, 1987
20.	7.12.1982	Krusadai Island, Gulf of Mannar, Tamilnadu (7 Nos caught in trawl net)	Krishna Pillai & Kasinathan, 1987
21.	15.12.1982	Krusadai Island, Gulf of Mannar, Tamilnadu (15-30 Nos caught in trawl net)	Krishna Pillai & Kasinathan, 1987
22.	1982-1984	Northern Indian Ocean (477 Nos sighted in 39 observations)	Alling, 1986
23.	July 1983	Cochin, Kerala (8 Nos incidentally caught in gill net)	Jayaprakash <i>et al.</i> , 1995
24.	Aug 1983	Cochin, Kerala (6Nos incidentally caught in gill net)	Jayaprakash <i>et al.</i> , 1995
25.	Sep 1983	Cochin, Kerala (9Nos incidentally caught in gill net)	Jayaprakash <i>et al.</i> , 1995
26.	Oct 1983	Cochin, Kerala (4Nos incidentally caught in gill net)	Jayaprakash <i>et al.</i> , 1995
27.	Feb 1984	Cochin, Kerala (4 Nos incidentally caught in gill net)	Jayaprakash <i>et al.</i> , 1995
28.	April 1984	Cochin, Kerala (2Nos incidentally caught in gill net)	Jayaprakash <i>et al.</i> , 1995
29.	May 1984	Cochin, Kerala (9Nos incidentally caught in gill net)	Jayaprakash <i>et al.</i> , 1995
30.	Oct 1985	Cochin, Kerala (9 Nos incidentally caught in gill net)	Jayaprakash <i>et al.</i> , 1995
31.	May 1986	Cochin, Kerala (10Nos incidentally caught in gill net)	Jayaprakash <i>et al.</i> , 1995
32.	Aug 1986	Cochin, Kerala (9 Nos incidentally caught in gill net)	Jayaprakash <i>et al.</i> , 1995
33.	Sep 1986	Cochin, Kerala (2Nos incidentally caught in gill	Jayaprakash <i>et al.</i> , 1995

		net)	
34.	Oct 1986	Cochin, Kerala (4Nos incidentally caught in gill net)	Jayaprakash <i>et al.</i> , 1995
35.	Nov 1986	Cochin, Kerala (3Nos incidentally caught in gill net)	Jayaprakash <i>et al.</i> , 1995
36.	Dec 1986	Cochin, Kerala (4Nos incidentally caught in gill net)	Jayaprakash <i>et al.</i> , 1995
37.	Between 15.03.1982 & 1.09.1987	Parangipettai, Tamilnadu	Rajaguru&Shantha, 1992
38.	28.01.1985	Krusadai Island, Gulf of Mannar, Tamilnadu	Krishna Pillai & Kasinathan, 1988
39.	1989	Parangipettai, Tamilnadu (1 No. kept in CAS in Marine Biology, Annamalai University Museum)	Karuppiah <i>et al.</i> , 1998
40.	13.04.1992	Visakhapatnam, Andhra	Chandrsekhar <i>et al.</i> , 1993
41.	28.04.1993	Kakinada, Andhra	NageswaraRao & Venkataramana, 1994
42.	1993	Visakhapatnam, Andhra	SeshagiriRao & NarayanaRao, 1993
43.	9.01.1995	Mandapam, Tamilnadu	Lipton <i>et al.</i> , 1995
44.	11.11.1995	Digha, West Bengal	Kar, 1996
45.	12.03.1997	Mela Manakudi, Tamilnadu	Krishna Pillai, 2002
46.	7.07.1997	Kakinada, Andhra	Venkataramana & Achayya, 1998
47.	5.09.1998	Kovalam, Thiruvananthapuram, Kerala	Thiagarajan <i>et al.</i> , 1999
48.	23.02.1999	Kanyakumari, Tamilnadu	Joel, 2000
49.	23.04.2000	Tuticorin (2 Nos rescued)	Balasubramanian, 2001
50.	24.04.2000	Tuticorin (1 No. rescued)	Balasubramanian, 2001
51.	23.11.2000	Usaravallai, Kanyakumari, Tamilnadu	Krishna Pillai, 2002
52.	Oct 2003-Feb 2007	Indian EEZ & Contiguous seas. (313 Nos sighted in 26 observations)	Afasl <i>et al.</i> , 2008
53.	3.12.2003	Mumbai, Maharashtra	Josekutty <i>et al.</i> , 2004
54.	17.12.2005	Dhanushkodi, Rameswaram, Tamilnadu	Afsal & Rajagopalan, 2007
55.	24.12.2005	CMFRI Jetty, Mandapam, Tamilnadu	Afsal & Rajagopalan, 2007
56.	20.07.2006	Kasimedu, Chennai, Tamilnadu	Mohan <i>et al.</i> , 2006
57.	30.4.2012	Kasimedu, Chennai, TN 1 stranded	CMFRI
58.	16.09.2012	Tuticorin Port, TN 1 stranded	CMFRI
59.	28.01.2013	Cuddalore, TN 1 stranded	CMFRI

23. Indo-Pacific Humpback Dolphin *Sousa plumbea* (Osbeck, 1765)

No.	Period	Details	Reference
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1.		Waltair, Visakhapatnam (Type locality)	Osbeck, 1765
2.	1800s	Alibag, Maharashtra	Sterndale, 1887
3.	1827	Malabar coast	VanBeneden and Gervais, 1868
4.	18.09.1854	off Visakhapatnam, Andhra	Owen, 1866
5.	April 1894	Alibag, Dhanu, Maharashtra (Reported by Sinclair as <i>Sotalia plumbea</i> . Sterndale confirmed as <i>Delphinus lentiginosus</i>)	Sinclair, 1895; Sterndale, 1987
6.	1900s	Calicut, Kerala (4 Skulls)	Jefferson & Van Waerebeek, 2004
7.	15.08.1903	Vizhinjam, Trivandrum (Described as <i>Tursiops fergusonii</i>)	Lydekker, 1903
8.	11.08.1908	Trivandrum, Kerala	Lydekker, 1908
9.	March 1955	Bombay, Maharashtra (2 Nos sighted)	Mörzer Bruyns, 1960
10.	1954-1958	Cochin, Kerala (5 Nos sighted)	Mörzer Bruyns, 1960
11.	6.01.1973	Mandovi Estuary, Goa (3 Nos stranded; Reported as <i>Sousa lentiginosa</i>)	Pilleri and Gihir, 1973
12.	16.12.1976	Devka, Daman, South Gujarat	Joglekar <i>et al.</i> , 1977
13.	April 1977	Udwada, Daman, South Gujarat	Joglekar <i>et al.</i> , 1977
14.	1977-1980	Calicut, Kerala (11 Nos caught in gillnet)	Lal Mohan, 1985
15.	2.09.1978	Calicut, Kerala	James & Lal Mohan, 1987
16.	1976-1980	Calicut coast, Kerala (11 animals sighted)	Lal Mohan, 1985
17.	22.12.1980	Off Calicut, Kerala (4 animals)	Harwood, 1980
18.	12.02.1981	Calicut, Kerala	Lal Mohan, 1983
19.	15.09.1981	Calicut, Kerala	Lal Mohan, 1982
20.	April 1982	Andaman Island	Leatherwood and Clarke, 1983
21.	April 1982	Parangipettai, Tamilnadu	Prudente <i>et al.</i> , 1997
22.	Jan-Mar 1983	Gahirmatha Beach, Orissa (4 Nos)	James <i>et al.</i> , 1989
23.	July 1983	Cochin, Kerala (9 animals were caught)	Jayaprakash <i>et al.</i> , 1995
24.	Aug 1983	Cochin, Kerala (6 animals were caught)	Jayaprakash <i>et al.</i> , 1995
25.	Sep 1983	Cochin, Kerala (9 animals were caught)	Jayaprakash <i>et al.</i> , 1995
26.	Oct 1983	Cochin, Kerala (5 animals were caught)	Jayaprakash <i>et al.</i> , 1995
27.	Jan-Mar 1984	Gahirmatha Beach, Orissa (3 Nos)	James <i>et al.</i> , 1989
28.	Feb 1984	Cochin, Kerala (2 animals were caught)	Jayaprakash <i>et al.</i> , 1995
29.	May 1984	Cochin, Kerala (4 animals were caught)	Jayaprakash <i>et al.</i> , 1995

30.	Jan-Mar 1985	Gahirmatha Beach, Orissa (2 Nos)	James <i>et al.</i> , 1989
31.	Sep 1985	Cochin, Kerala (2 animals were caught)	Jayaprakash <i>et al.</i> , 1995
32.	1986	Dudya River, West Bengal (Misidentified. It could be ganges river dolphin <i>Platanista Gangetica</i>).	Ghosh & Choudhary, 1986
33.	Jan-Mar 1987	Gahirmatha Beach, Orissa (4 Nos)	James <i>et al.</i> , 1989
34.	May 1986	Cochin, Kerala (5 animals were caught)	Jayaprakash <i>et al.</i> , 1995
35.	Sep 1986	Cochin, Kerala (2 animals were caught)	Jayaprakash <i>et al.</i> , 1995
36.	Oct 1986	Cochin, Kerala (1 animal was caught)	Jayaprakash <i>et al.</i> , 1995
37.	Dec 1986	Cochin, Kerala (1 animal was caught)	Jayaprakash <i>et al.</i> , 1995
38.	1989	Parangipettai, Tamilnadu (10 individuals sighted)	Karuppiyah <i>et al.</i> , 1998
39.	26.04.1990	Parangipettai, Tamilnadu (Caught in gillnet)	Tanabe <i>et al.</i> , 1993
40.	18.06.1990	Mandapam Camp, Tamilnadu	Krishna Pillai <i>et al.</i> , 1991
41.	24.01.1991	Tuticorin, Tamilnadu. (Probably <i>Stenella 62ttenuate</i>).	Arumugam <i>et al.</i> , 1991
42.	10.03.1991	Parangipettai, Tamilnadu (Caught in gillnet)	Tanabe <i>et al.</i> , 1993
43.	1992	Parangipettai, Tamilnadu (Caught in gillnet)	Tanabe <i>et al.</i> , 1993
44.	11.07.1993	Tuticorin, Tamilnadu (8 Nos stranded)	Kasim <i>et al.</i> , 1993
45.	16.02.1994	Tuticorin, Tamilnadu	Arumugam <i>et al.</i> , 1995
46.	15.09.1994	Mandapam Camp, Tamilnadu	Lipton <i>et al.</i> , 1995
47.	1997	Goa	Parsons, 1998
48.	20.03.1997	Murud Janjira, Maharashtra (Reported as <i>Delphinus delphis</i>)	Jadhav & Rao, 1998
49.	18.10.1997	Veraval, Gujarat (Probably <i>Stenella 62ttenuate</i>).	Kizhakudan <i>et al.</i> , 1998
50.	15.11.1997	Murud Janjira, Maharashtra	Rao, 1998
51.	Nov 1998-Feb 1999	Gahirmatha, Orissa (Several sighted; 2 Nos stranded)	Sutaria & Jefferson, 2004
52.	28.06.1999	Vellapatty, Tuticorin, Tamilnadu (28 Nos stranded)	Balasubramanian <i>et al.</i> , 2000
53.	Jan 2002	Gulf of Kachchh, Gujarat (21 Nos sighted and 1 stranded)	Sutaria & Jefferson, 2004
54.	Oct 2002	Goa (135 Nos sighted)	Sutaria & Jefferson, 2004
55.	21.11.2002	Goa (2 Nos stranded)	Sutaria & Jefferson, 2004
56.	Oct 2003-Feb 2007	Indian EEZ & Contiguous seas. (65 Nos sighted in 18 observations).	Afsal <i>et al.</i> , 2008
57.	9.12.2003	Sangumal, Rameswaram, Tamilnadu	Kasinathan <i>et al.</i> , 2004

58.	Oct 2004	Chennai, Tamilnadu (2 Nos incidentally caught in fishing gear)	Yousuf <i>et al.</i> , 2008
59.	Nov/Dec 2005	Mangalore, Karnataka (2 Nos incidentally caught in fishing gear)	Yousuf <i>et al.</i> , 2008
60.	18.01.2005	Rameswaram, Tamilnadu	Gandhi, 2005
61.	29.06.2006	Kasimedu, Chennai, Tamilnadu	Mohan <i>et al.</i> , 2006
62.	22.10.2007	Mandapam, Tamilnadu	Venkatesan & Ramamurthy, 2008
63.	5.04.2012	Junabander, Bhavnagar, Gujarat	CMFRI
64.	28.02.2013	Rushikulya River, Odisha 1 stranded	CMFRI
65.	21.09.2013	Point Calimere, Palk Bay. 1 stranded	Jeyabaskaran <i>et al.</i> , 2013
66.	18.11.2014	Kochi, Kerala. 1 carcass	Jeyabaskaran <i>et al.</i> , 2014
67.	17.09.15	Beypore beach, Kozhikode. 1 stranded	Thirumalaiselvan <i>et al.</i> , 2015

24. Irrawaddy Dolphin *Orcaella brevirostris* (Gray, 1886)

No.	Period	Details	Reference
1.	1852	Visakhapatnam, Andhra. (Identified as <i>Phocaena brevirostris</i> by Owen based on a skull given by Sir Walter Elliot.	Owen, 1866
2.	1871	Ganges river upstream, Bay of Bengal, West Bengal	Anderson, 1871; De Silva, 1987
3.	1891	Chilka lake, Orissa	Blanford, 1891
4.	1915	Chilka lake, Orissa & Irrawady River, Myanmar (Sighted large numbers)	Annandale, 1915
5.	1966	Ganges, Brahmaputra, Irrawady, Makaham.	Morzer Bruins, 1966
6.	1985-1987	Chilka lake, Orissa (5 Nos observed; 3 live and 2 dead specimens).	Dhandapani, 1992
7.	March 1987	Gahirmatha beach, Orissa (1 No. stranded)	James <i>et al.</i> , 1989
8.	1999-2001	Chilika lake, Orissa (15 Nos found dead).	Sinha, 2004
9.	Jul, Sep & Dec 2000	Chilika lake, Orissa (31 Nos sighted).	Sinha, 2004
10.	2003	Chilika lagoon, Orissa. (89 Nos)	Muntaz Khan <i>et al.</i> , 2011
11.	2004	Chilika lagoon, Orissa. (124 Nos)	Muntaz Khan <i>et al.</i> , 2011
12.	2005	Chilika lagoon, Orissa. (111 Nos)	Muntaz Khan <i>et al.</i> , 2011
13.	2006	Chilika lagoon, Orissa. (131 Nos)	Muntaz Khan <i>et al.</i> , 2011
14.	2007	Chilika lagoon, Orissa. (135 Nos)	Muntaz Khan <i>et al.</i> , 2011
15.	2008	Chilika lagoon, Orissa. (138 Nos)	Muntaz Khan <i>et al.</i> , 2011
16.	2009	Chilika lagoon, Orissa. (146 Nos)	Muntaz Khan <i>et al.</i> , 2011
17.	2010	Chilika lagoon, Odhisa (158 Nos)	Chilika Development Authority. (The

			Hindu News Paper dated 20.02.2011)
18.	2010	Chilika lagoon, Orissa.	Jayasankar <i>et al.</i> , 2011
19.	2011	Chilika lagoon, Odhisa (156 Nos)	Chilika Development Authority. (The Hindu News Paper dated 20.02.2011)

25. Finless Porpoise *Neophocaena phocaenoides* (G. Cuvier, 1829)

No.	Period	Details	Reference
1.	1827	Malabar coast, Kerala. Collected by Dussumier and mounted specimen kept in the Museum National d'Histoire Naturelle, France.	Gray, 1846; De Silva, 1987
2.	1866	Madras, Tamilnadu. Described as <i>Delphinapterus molagen</i> (Type specimen) by Owen, 1866	De Silva, 1987
3.	12.11.1959	Malpe, Karnataka (19 Nos caught in gill net).	Dawson, 1959
4.	12.02.1965	Off Karwar, Karnataka. (Reported as <i>Neomeris phocaenoides</i>)	Devaraj & Sam Bennet, 1974
5.	10.02.1973	Off Calicut, Kerala (1 No. incidentally caught in gill net).	Balan, 1976
6.	1976	Calicut coast, Kerala. (8 Nos incidentally caught in gill net)	Lal Mohan, 1985
7.	?	Zuari River, Vasco, Goa	Hafeezullah, 1984
8.	Jan 1981-Dec 1987	Cochin, Kerala. (3 Nos landed during the period)	Jayaprakash <i>et al.</i> , 1995
9.	Feb 1986	Gahirmatha, Orissa (2 Nos stranded).	James <i>et al.</i> , 1989
10.	March 1987	Gahirmatha, Orissa (2 Nos stranded).	James <i>et al.</i> , 1989
11.	8.07.1988	Mandapam, Tamilnadu	Nammalwar <i>et al.</i> , 1994
12.	1989	Parangipettai, Tamilnadu. (1500 Nos killed (Reported by PL.Kumaran).	Karppiah <i>et al.</i> , 1998
13.	11.08.1990	Pillaimadam, Mandapam, Tamilnadu	Nammalwar <i>et al.</i> , 1994
14.	16.11.1990	Rameswaram, Tamilnadu	Nammalwar <i>et al.</i> , 1994
15.	25.10.1992	Rameswaram, Tamilnadu	Nammalwar <i>et al.</i> , 1994
16.	21.01.1992	Thondi, Tamilnadu (3 Nos stranded)	Ganapathy, 1992
17.	29.01.1992	Parangipettai, Tamilnadu. (Caught in gill net)	Kumaran & Subramanian, 1993
18.	14.09.1995	Ullal, Mangalore, Karnataka	Muthiah, 1995
19.	18.01.1999	Rameswaram, Tamilnadu	Bose, 2000
20.	31.01.2001	Sangumal, Rameswaram, Tamilnadu	Kasinathan, 2002
21.	Jan 2001	Seemar Bunder, Gujarat. (1 No. incidentally caught in dol net).	Kizhakudan, 2002
22.	16.09.2002	Vencode, Rameswaram, Tamilnadu	Bose and Palanichami, 2003
23.	6.11.2003	Malpe, Karnataka. (2 Nos incidentally caught in pursesein)	Anoop <i>et al.</i> , 2004
24.	5.11.2005	Malpe, Karnataka (1 No. incidentally caught in gill net)	Jayasankar <i>et al.</i> , 2008
25.	17.11.2005	Malpe, Karnataka (1 No. incidentally caught in gill net)	Jayasankar <i>et al.</i> , 2008

26.	25.11.2005	Gangoli, Karnataka (8 Nos incidentally caught in gill net).	Jayasankar <i>et al.</i> , 2008
27.	1.12.2005	Mangalore, Karnataka (1 No. incidentally caught in gill net).	Jayasankar <i>et al.</i> , 2008
28.	2.01.2006	Mangalore, Karnataka (1 No. incidentally caught in gill net).	Jayasankar <i>et al.</i> , 2008
29.	15.02.2009	Khodinar, Gujarat (1 No. stranded)	Dinesh Goswami (Personal communication)
30.	1.04.2012	Raigad, Ratnagiri, Maharashtra 1 stranded	CMFRI
31.	14.04.2012	Karwar, Karnataka 1 stranded	CMFRI
32.	1.10.2013	Bunder Harbour, Karnataka. 1 incidentally caught and landed	Bindhu <i>et al.</i> , 2013 (MFIS, 217).

26. Sea cow *Dugong dugon* (Müller, 1776)

No.	Period	Details	Reference
1.	1877	Sachana, Jamnagar, Gujarat	Moses, 1942
2.	1889	Pamban, Gulf of Mannar	Thurston, 1895
3.	April 1893	Mandvi, Gulf of Kachchh	Phipson, 1895
4.	1905?	Kilakarai, Gulf of Mannar	Prater, 1928
5.	1910	Tuticorin, Gulf of Mannar	Prater, 1928
6.	1918?	Krusadai Island, Gulf of Mannar	Prater, 1928
7.	1928–1929 (5 Nos)	Rameswaram, Gulf of Mannar	Prater, 1929
8.	08.03.1929	Andaman	Prater, 1929
9.	29.05.1950	Mandapam Camp, Gulf of Mannar	Jones, 1959
10.	23.03.1955 (0.95 m Live specimen)	CMFRI Aquarium, Mandapam	Jones, 1959
11.	14.06.1955 (2.12 m live specimen)	CMFRI Aquarium, Mandapam	Jones, 1959
12.	1955	Adirampatnam, Palk Bay	Jones, 1959
13.	26.12.1956 (2.5 m live specimen)	Maintained for 4 months in CMFRI Aquarium, Mandapam	Jones, 1959
14.	17.07.1959	Bedi Bunder, Jamnagar, Gujarat	Mani, 1960; Silas, 1961
15.	30.07.1959 (3.9 m female specimen)	Bedi Bunder, Jamnagar, Gujarat	Mani, 1960; Silas, 1961
16.	02.10.1959 (1.6 m male)	Hare Island, Gulf of Mannar	Jones, 1959
17.	06.12.1959 (1.96 m female)	Hare Island, Gulf of Mannar	Jones, 1959
18.	06.12.1959 (2.4 m Male)	Hare Island, Gulf of Mannar	Jones, 1959
19.	06.12.1959 (2.42 m Female)	Hare Island, Gulf of Mannar	Jones, 1959
20.	06.12.1959 (2.26 m	Hare Island, Gulf of Mannar	Jones, 1959

	Female)		
21.	1.6 m live	CMFRI Aquarium, Manadapam	Silas, 1961
22.	07.01.1962 (2 Nos)	Piroton Island, Gulf of Kachchh	Lal Mohan, 1963
23.	06.03.1962 (2.73 m)	Salaya, Gulf of Kutch	Lal Mohan, 1963
24.	Jan 1971–Sep 1975 (146 Nos caught)	Gulf of Mannar and Palk Bay	Lal Mohan, 1976
25.	31.05.1974 (2 live)	CMFRI Aquarium, Manadapam	Nair & Lal Mohan, 1975
26.	08.07.1977	off Port Blair	Sivaprakasam, 1980
27.	15.06.1978	Bhaidar Island, Gulf of Kachchh	Bhaskar, 1978
28.	Apr 1983– Aug 1984 (250 Nos caught)	Kilakkarai and Periapattinam, Gulf of Mannar	Silas and Bastian Fernando, 1985
29.	03.09.1983 (2 Nos)	Bet Dwarka, Gulf of Kachchh	Frazier & Mundkur, 1990
30.	September 1983	Thonithurai, Gulf of Mannar	Silas and Bastian Fernando, 1985
31.	December 1983	Mandapam, Gulf of Mannar	Silas & Bastian Fernando, 1985
32.	August 1984 (6 Nos)	Thiruppalaikudi, Palk Bay	Silas and Bastian Fernando, 1985
33.	16.12.1986 (3.1 m Male)	Mandapam	Krishna Pillai, Ambrose <i>et al.</i> , 1989
34.	05.01.1987	Bet Dwarka, Gulf of Kachchh	Frazier & Mundkur, 1990
35.	07.01.1987 (1.72 m Male)	Poshitra Point, Gulf of Kachchh	Frazier & Mundkur, 1990
36.	March, 1989	Hut Bay, Little Andaman	Rao, 1990
37.	July, 1989	Pilo Kunji, Great Nicobar	Das and Dey, 1999
38.	1990–1995 (45 Nos)	Andaman and Nicobar Islands	Das and Dey, 1999
39.	29.09.1990	Periapattinam, Gulf of Mannar	Krishna Pillai & Badrudeen, 1991
40.	14.12.1994	Periapattinam, Gulf of Mannar	Badrudeen <i>et al.</i> , 2004
41.	16.02.1995	Jagathapattinam, Palk Bay	Badrudeen <i>et al.</i> , 2004
42.	02.06.1995	Pudumadam, Gulf of Mannar	Badrudeen <i>et al.</i> , 2004
43.	17.06.1995	Appa Island, Gulf of Mannar	Badrudeen <i>et al.</i> , 2004
44.	30.10.1995	Periapattinam, Gulf of Mannar	Badrudeen <i>et al.</i> , 2004
45.	25.11.1995	Kiakkarai, Gulf of Mannar	Badrudeen <i>et al.</i> , 2004
46.	11.12.1995	Kilakkarai, Gulf of Mannar	Badrudeen <i>et al.</i> , 2004
47.	21.12.1995	Mundal, Gulf of Mannar	Badrudeen <i>et al.</i> , 2004
48.	10.01.1996	Kannirajapuram, Gulf of Mannar	Badrudeen <i>et al.</i> , 2004
49.	14.03.1996	Valinokkam, Gulf of Mannar	Badrudeen <i>et al.</i> , 2004
50.	14.06.1996	Periapattinam, Gulf of Mannar	Badrudeen <i>et al.</i> , 2004
51.	20.06.1996	Kalimankundu, Gulf of Mannar	Badrudeen <i>et al.</i> , 2004
52.	05.08.1996	Periapattinam, Gulf of Mannar	Badrudeen <i>et al.</i> , 2004
53.	07.09.1996	Rameswaram, Gulf of Mannar	Badrudeen <i>et al.</i> , 2004
54.	11.01.1997	Seenappa Darha, Gulf of Mannar	Badrudeen <i>et al.</i> , 2004
55.	12.01.1997	Valinokkam, Gulf of Mannar	Badrudeen <i>et al.</i> , 2004
56.	14.01.1997	Kilakkarai, Gulf of Mannar	Badrudeen <i>et al.</i> , 2004

57.	15.01.1997	Seeniappa Darha, Gulf of Mannar	Badrudeen <i>et al.</i> , 2004
58.	26.01.1997	Kilakkarai, Gulf of Mannar	Badrudeen <i>et al.</i> , 2004
59.	10.02.1997	Valinokkam, Gulf of Mannar	Badrudeen <i>et al.</i> , 2004
60.	19.02.1997 (2.63 m Female)	Hut Bay, Little Andamans	Das and Dey, 1999
61.	08.09.1997	Muthupettai, Palk Bay	Badrudeen <i>et al.</i> , 2004
62.	11.10.1998	Morpannai, Palk Bay	Badrudeen <i>et al.</i> , 2004
63.	03.11.1997	Periapattinam, Gulf of Mannar	Badrudeen <i>et al.</i> , 2004
64.	07.12.1997	Seeniappa Darha, Gulf of Mannar	Badrudeen <i>et al.</i> , 2004
65.	10.12.1997	Seeniappa Darha, Gulf of Mannar	Badrudeen <i>et al.</i> , 2004
66.	02.02.1998	Periapattinam, Gulf of Mannar	Badrudeen <i>et al.</i> , 2004
67.	20.03.1998	Alagakulam, Palk Bay	Badrudeen <i>et al.</i> , 2004
68.	30.04.1998	CMFRI Jetty, Manadapam Camp, Gulf of Mannar	Badrudeen <i>et al.</i> , 2004
69.	02.07.1998	Alagakulam, Palk Bay	Badrudeen <i>et al.</i> , 2004
70.	28.03.1999	Mandapam, Gulf of Mannar	Badrudeen <i>et al.</i> , 2004
71.	14.01.2000	Tharuvaikulam, Gulf of Mannar	Badrudeen <i>et al.</i> , 2004
72.	Feb' 2000-Mar' 2002	Bhaidar Island, Gulf of Kachchh	Singh, 2003
73.	Feb' 2000-Mar' 2002 (2 Nos)	Bharana coast, Gulf of Kachchh	Singh, 2003
74.	Feb' 2000-Mar' 2002	Poshitra coast, Gulf of Kachchh	Singh, 2003
75.	December 2000	Manauli Island, Gulf of Mannar	J.C. Daniel, personal communication
76.	18.09.2003 (194 cm male)	Mandapam, Gulf of Mannar	Raju <i>et al.</i> , 2004
77.	19.09.2003	Devipattinam, Palk Bay	The Hindu 20.9.2003
78.	20.03.2006 (240 cm male)	Kundhukal, Gulf of Mannar	Afsal & Rajagopalan, 2007
79.	17.06.2006	Vedalai, Gulf of Mannar	Afsal & Rajagopalan, 2007
80.	03.10.2007 (275 cm)	Dhanuskodi, Gulf of Mannar	Venkatesan, <i>et al.</i> , 2008
81.	December 2007	Dwarka, Gulf of Kachchh	expressindia.com 1.06.2008
82.	Feb 2007-March 2008 (1 live, 2 m)	Havelock Island, Andaman	Vardhan & D'souza, 2009
83.	Feb 2007-March 2008 (1 live, 2.5 m)	Neil Island, Andaman	Vardhan & D'souza, 2009
84.	Feb 2007-March 2008 (1 live, 3 m)	Kodiaghat, Andaman	Vardhan & D'souza, 2009
85.	13.03.2009 (310 cm)	Pudupattinam, Palk Bay	GoMBRT
86.	23.09.2009 (257 cm)	Pudumadam, Gulf of Mannar	GoMBRT
87.	15.01.2010	Jamnagar Coast, Gulf of Kachchh, Gujarat	Times of India, 16.01.2010
88.	06.04.2010 (147 cm)	Rameswaram, Gulf of Mannar	Vinod <i>et al.</i> , 2010
89.	16.04.2010	Seeniappa Dargah, Mandapam	The Hindu, 17.04.2010
90.	14.10.2010 (240 cm)	Vedalai, Gulf of Mannar	GoMBRT

91.	08.11.2010 (250 cm)	Mangaleswari Nagar, Keelakkarai, Gulf of Mannar	GoMBRT
92.	04.03.2011 (278 cm)	Tiruchendur, Gulf of Mannar	GoMBRT
93.	01.05.2011 (275 cm)	Mandapam, Gulf of Mannar	GoMBRT
94.	06.08.2011	Kottaipattinam, Palk Bay	The Hindu, 6.08.2011
95.	20.10.2012 (134 cm)	Panaikulam, Palk Bay	The Hindu, 21.10.2012
96.	8.01.2013	Gulf of Kachchh, Gujarat 1 stranded	Yoheskumar <i>et al</i> , 2013
97.	11.12.2013	Periyapattinam, Palk Bay	The Times of India, 12.12.2013
98.	24.03.2015	Maraikayarpattnam, Gulf of Mannar. 1 stranded	Saravanan <i>et al.</i> , 2015
99.	5.04.2016	Manalmelkudi, Palk Bay. 1 stranded (female 1.4m length)	Balaji, OMCAR, 2016

Enhancing the Effectiveness of Conservation Potential of Marine Mammals in Indian Seas

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